THE MARINE REVIEW

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Merchant Work in Coast Yards

The Coast Ship Yards Have a Splendid Construction Program and Will Be Busy All Year

SINCE the beginning of the year coast shipyards have fast filled up with merchant work and the program now outlined is the best that they have enjoyed for a decade. In addition to the contracts that have actually been placed additional orders are pending, and a vacant berth in a coast yard will in all probability be a rarity during 1915. Steamship interests are placing orders with a liberal hand for new tonnage in absolute defiance of the legislative program contemplated by congress which was calculated to increase the neutral hazard of the business.

This program has, of course, been stimulated by the actual shortage now existing in ships for oversea trade, as well as by the excellent freight rates prevailing. In fact, freight rates today have reached the highest point in the history of ocean navigation. It is one of the mysteries of economics that when trade is flat on land it is quite likely to be lively on the sea. Such was the case following the depression incident to the financial panic of 1907. Oversea interchanges gradually increased with a consequently ascending scale of freight rates until steamship owners were enjoying such handsome profits that the oldest broker in the business could not remember when they were better. However, handsome as those profits were they were by no means equal to those obtaining today, though of course the war has introduced new risks. Detentions obviously cut into profits but the rates are high enough to cover everything.

There is a drastic shortage in ships for oversea trade at present. The whole oversea commerce of the world is deranged. For all practical purposes the German and Austrian merchant marine have ceased to exist, while British tonnage has been seriously crippled, not only by the enemy but by the necessities of the British government for merchant vessels for auxiliary purposes. It is stated that 1500 ships of the British mercantile marine are at present not available for purposes of trade. The opening, therefore, for new tonnage is certainly a splendid one and it is a regrettable circumstance that the United States has not now the ships available to care for this trade. In fact, there are only fifteen vessels of 1,000 net tons and over flying the American flag on the Atlantic and Pacific. This does not include, of course, the number that have been transferred to American register since the war broke out, but even adding these the United States has but a little more than 2 per cent of the world's tonnage registered for foreign trade. In contrast with this the foreign commerce of the United States aggregates the stupendous sum of $3,785,500 during the fiscal year ending June 30 last. This commerce is now going abroad at most fabulous rates. The grain rate from the Atlantic seaboard to English ports has jumped from 4 cents to 16 cents a bushel, an advance of 400 per cent. The rate on cotton from New York to Liverpool has increased from 20 cents to 75 cents per hundred-weight, an advance of 275 per cent. To Rotterdam it has jumped from $1 to $5 per bale. These are certainly tempting rates and it is a great pity that it will be several months yet before this tonnage can take advantage of them.

The inevitable result of an armed conflict in Europe upon our commerce was long ago pointed out to congress, but without result. These courageous men who have now entered the market to supply the country's deficiencies should receive the support of bankers and manufacturers generally. They are not only seeking to liberate our commerce but they are doing the most direct thing to revive our depressed industries for

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there is no single structure that touches so many industries as a ship.

Among the contracts that have been let are the following:

One freight and two lumber steamers for the American-Hawaiian Steamship Co., a freighter for the Munson Steamship Co., and a freighter for the A. H. Bull Steamship Co., to the Maryland Steel Co.

Two freighters for the Coastwise Transportation Co.; oil tanker for the Gulf Refining Co., and a single screw lumber steamer for the Carpenter-O'Brien Co., to the New York Ship Building Co.

Three tank steamers for the Standard Oil Co., a freighter for the Luckenbach Steamship Co., freighter for the New York & Porto Rico Steamship Co., freighter for the Crowell & Thurlow Steamship Co., with the Newport News Ship Building & Dry Dock Co.

Tanker for the Anglo-Saxon Petroleum Co., with the Harlan & Hollingsworth Corporation.

Two tank steamers for the Texas Co. to the Fore River Shipbuilding Corporation.

In addition, the Merchants & Miners Transportation Co., the Ocean Steamship Co., and W. R. Grace & Co. are in the market for vessels.

New Construction

Newport News Shipbuilding & Dry Dock Co., Newport News, Va.

Three oil tankers, duplicates, for Standard Oil Co. of N. J.; length over all, 516 feet; estimated gross tonnage, 11,000; twin-screw engines; estimated horsepower, 3,000.

Freight steamer, 347 feet 5 inches over all, for New York & Porto Rico Steamship Co., New York; estimated gross tonnage, 3,063; single-screw engines; estimated horsepower, 1,500.

Freighter for the Luckenbach Steamship Co. of New York.

Freight steamer, 375 feet over all, for Crowell & Thurlow Steamship Co., Boston, Mass.; estimated gross tonnage, 4,388; single screw engine; estimated horsepower, 1,700.

Wm. Cramp & Sons Ship & Engine Building Co., Philadelphia, Pa.

Steel express passenger steamers Great Northern and Northern Pacific, duplicates, for the Great Northern Pacific Steamship Co., Portland, Ore.; length over all, 520 feet; estimated gross tonnage, 8,255; turbine engines, twelve water-tube boilers; estimated horsepower, 25,000.

Steel car ferry Henry M. Flagler for the Florida East Coast Railway Co., Key West, Fla.; length over all, 350 feet; estimated gross tonnage, 2,699; twin-screw triple-expansion engines, four Scotch boilers; estimated horsepower, 2,500.

Harlan & Hollingsworth Corporation, Wilmington, Del.

Single screw steel oil tanker, 430 feet long, for The Schell Co., of California, San Francisco, Cal.; approximate value, $628,000; estimated gross tonnage, 8,500; one triple-expansion engine; three cylindrical return tube boilers; estimated horsepower, 3,000.

Twin-screw steel car ferry, 110 feet over all, for Bethlehem Steel Co., South Bethlehem, Pa.; approximate value, $25,000; estimated gross tonnage, 150; two gasoline engines, made by Harris Machine Co., Wilmington, Del.; estimated horsepower, 150.

Bulk oil barge, 146 feet 8 inches over all for Robert K. Cassott, Philadelphia; capacity, 100,000 gallons; approximate value, $22,000; estimated gross tonnage, 261.

New York Ship Building Co., Camden, N. J.

Steel single screw lumber steamer William O'Brien, 377 feet 5 inches over all, for Carpenter O'Brien Co., New York; estimated gross tonnage, 5,528; reciprocating, triple-expansion engines; three single-ended Scotch boilers; estimated horsepower, 2,000.

Steel single screw bulk oil steamer for Gulf Refining Co., Pittsburgh, Pa.; length over all, 406 feet 6 inches; estimated gross tonnage, 5,188; reciprocating, triple-expansion engines; three single-ended Scotch boilers; estimated horsepower, 2,650.

Two single-screw colliers, for the Coastwise Transportation Co., Boston, Mass.; 395 feet 4 inches long, over all; about 5,000 gross tons; reciprocating triple-expansion engines; three single-ended Scotch boilers.

Dredge hull for the Bucyrus, Co., South Milwaukee, Wis.

Maryland Steel Co., Sparrow's Point, Md.

Steel colliers Ulysses and Achilles, duplicates, for the Panama Canal Commission, Washington, D. C.; length over all, 536 feet; estimated gross tonnage, 10,650; two triple-expansion engines; three double-ended Scotch boilers; estimated horsepower, 7,200.

Steel freight steamer, 338 feet over all, for Bull Steamship Co., New York; estimated gross tonnage, 3,400; triple-expansion engine; two single-ended Scotch boilers; estimated horsepower, 1,500.

One steel freight and passenger steamer, 367 feet 9 inches length over all; triple expansion engine and three single ended Scotch boilers, for the Munson Steamship Line, New York.

One steel freight steamer, 414 feet 2 inches length between perpendiculars; one quadruple-expansion engine and three single ended Scotch boilers, for the American-Hawaiian Steamship Co., New York.

Two lumber steamers, duplicates, 398 feet 6 inches length between perpendiculars; one triple-expansion engine and three single ended Scotch boilers, for the American-Hawaiian Steamship Co., New York.

Bath Iron Works, Bath, Me.

Steel torpedo testing steamer, 131 feet long, for E. W. Bliss & Co., New York; displacement, 300 tons; single screw, triple-expansion engine; two Almy watertube boilers, 300 horsepower; oil fuel.

Fore River Ship Building Corporation.

Two oil tankers for the Texas Co.

Staten Island Shipbuilding Co., Port Richmond, S. I., N. Y.

Steel steamers Gorgona and Tavernilla, duplicates, for the Isthmian Canal Commission, Washington, D. C.; length over all, 125 feet; estimated gross tonnage, 400; single, compound engine; two Scotch boilers; estimated horsepower, 1,000.

Steel steamer Petrel, 126 feet over all, for the Pennsylvania Coal Co.; estimated gross tonnage, 400; single, triple-expansion engine; one Scotch boiler; estimated horsepower, 600.

Steel steamer, 80 feet over all, for Erie Railroad Co., New York.

Steel steamer, 100 feet over all, for stock; estimated gross tonnage, 180; single, compound engine; one Scotch boiler.

Clooney Construction & Towing Co., Westlake, La.

Two-masted wooden schooner, 108 feet over all, for the Oil Fields of

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Mexico Co., 576 Fifth avenue, New York; approximate value, $15,000; estimated gross tonnage, 150; two 65 horsepower Wolverine engines; estimated horsepower, 130.

Wooden dredge hull, 155 feet over all, for Union Sulphur Co., Sulphur, La.; hull and house valued approximately, $18,000; estimated gross tonnage, 400; Bucyrus equipment.

Wooden dredge hull, 50 feet over all, for Union Sulphur Co., Sulphur, La.; hull and house valued at $2,000; estimated gross tonnage, 50; Bucyrus equipment.

Wooden coal barge, 135 feet long, for Clinchfield Fuel Co., Spartanburg, S. C.; house and hull valued at $10,000; estimated gross tonnage, 350; no engine.

Dubuque Boat & Boiler Works, Dubuque, Iowa.

Steel steamer Warioto, 141 feet over all, for U. S. Engineer at Nashville, Tenn.; approximate value, $40,000; estimated gross tonnage, 300; Gillett, Eaton & Squires H. P. engine; estimated horsepower, 350.

Steel steamer Comanche, 141 feet over all, for U. S. Engineer, Peoria, Ill.; approximate value, $40,000; estimated gross tonnage, 300; Gillett, Eaton & Squires H. P. engine; estimated horsepower, 350.

Steel steamer Dennison, 136 feet over all, for U. S. Engineer, Dallas, Texas; approximate value, $55,000; estimated gross tonnage, 300; Gillett, Eaton & Squires H. P. engine; estimated horsepower, 250.

Steel dredge Marietta, 100 feet long, for U. S. Engineer, Cincinnati, O.; approximate value, $65,000; estimated gross tonnage, 150; machinery by M. A. Sweeney Ship Yard & Foundry Co., Jeffersonville, Ind.

The Kelley-Spear Co., Bath, Me.

Three-masted wooden barge, about 241 feet over all, for Staples Transportation Co., Fall River, Mass.; estimated gross tonnage, 1,315.

Four-masted wooden barge, about 268 feet over all, for Staples Transportation Co., Fall River, Mass.; estimated gross tonnage, 1,849.

Wm. Cryer, East Oakland, Cal.

Round stern launches, Crowley No. 16 and Crowley No. 11, duplicates, for Crowley Launch & Tugboat Co., San Francisco; length over all, 45 feet; approximate value, $4,000; estimated gross tonnage, 8; Standard gas engine; estimated horsepower, 50.

Round stern tow boat, 52 feet over all, for William Fisher, San Francisco; approximate value, $6,000; estimated gross tonnage, 15; Imperial gas engine; estimated horsepower, 75.

Twin screw, round stern launch, 30 feet over all, for P. Nelson, San Francisco; approximate value, $3,000; estimated gross tonnage, 4; Standard gas engine.

Greenport Basin & Construction Co., Greenport, N. Y.

Launch Selina, 28 feet long, for Samuel Hird, Passaic, N. J.; approximate value, $2,500; four cycle, 25:30 horsepower Sterling motor; estimated horsepower, 25-30.

Launch Turbree, 41 feet 6 inches long, for A. Schwarzmann, Puck building, New York; approximate value, $4,000; four-cylinder, 5½ x 8 inch Sterling motor; 35 horsepower.

Launches Nos. 6, 7 and 8, duplicates, for E. W. Bliss Co., Brooklyn, N. Y.; length, 40 feet; estimated cost, $4,000; four-cylinder, 5½ x 8-inch Sterling motor, 35 horsepower.

Launch Bawoona, 35 feet long, for Henry Sandford, Redfield, Conn.; 4¾ x 5½ Loew-Victor engine, 80 horsepower.

Launch Rosebud, 32 feet long, for Capt. John J. Phelps, Hackensack, N. Y.; approximate value, $5,000; eight-cylinder, 5½ x 6¾ Sterling motor, 150-180 horsepower.

Southern Pacific Co., West Oakland Yards, West Oakland, Cal.

Steel side-wheel passenger ferry boat Santa Clara for the Southern Pacific Co.; length over all, 293 feet; approximate value, $400,000; estimated gross tonnage, 2,300; two duplex tandem compound condensing engines, 20-40 inches x 8 feet; estimated horsepower, 2,500.

Pusey & Jones Co., Wilmington, Del.

Two steel motor boats, duplicates, 80 feet over all, for Lake Keuka Navigation Co., Hammondsport, N. Y.; estimated gross tonnage, 105; Buffalo engines; estimated horsepower, 50.

Samuel Peters & Son, Wabasha, Minn.

Stern-wheel steamer Orion, 127 feet over all; approximate value, $13,000; estimated gross tonnage, 145; two non-condensing engines, 12 x 6; two boilers, 18 feet x 36 inches; estimated horsepower, 350.

J. N. Rafuse, Conquerall Banks, N. S.

Barge, 175 feet over all, for J. N. Rafuse, et al.; approximate value, $20,000; estimated gross tonnage, 240; fitted with gas engine for hoisting.

Two barges, duplicates, for J. N. Rafuse, et al.; length over all, 102 feet; approximate value $7,000; estimated gross tonnage, 91.

J. F. Duthie & Co., Seattle, Wash.

Wooden stern-wheel steamer, 130 feet over all, for North West Fisheries Co., Seattle, Wash.; approximate value, $35,000; two 12 x 60 condensing engines; estimated horsepower, 300.

Thames Tow Boat Co., New London, Conn.

Wooden derrick lighter Captain Dud, 80 feet long, 40 feet beam, 6 feet deep, for Thames Tow Boat Co.; hoisting engine furnished by the Lenher Engineering Co.

John Ryan, Whitehall, N. Y.

Canal boat, wooden, 100 feet over all; approximate value $4,000; estimated gross tonnage, 150. For sale.

F. S. Bowker & Son, Phippsburg, Me.

Wooden three-masted sailing vessel, 163 feet over all; approximate value, $35,000; estimated gross tonnage, 564.

Arthur D. Story, Essex, Mass.

Fishing schooner Henrietta, 110 feet over all, for E. M. Cromwell & Co., State street, Boston; approximate value, $17,000; estimated gross tonnage, 100; gasoline engine; estimated horsepower, 100.

Sutherland & Sons, Grassy Point, N. Y.

Tug boat, 117 feet long, fitted with fore and aft compound engine, for White Star Towing & Transportation Co.

Notes on New Construction

The Charles Barnes Co., Cincinnati, O., are building a boat for the South Australian government to be shipped in knocked down condition and erected at Port Adelaide, South Australia.

C. C. Walker, shipbuilder of Toledo, Oregon, is building a fishing schooner 55 feet long, 14 feet beam and equipped with a 40-horsepower Twentieth Century engine, for Howard Meagher, San Diego, Cal.

The Seattle Construction & Dry Dock Co. has secured a contract from the Electric Boat Co., of New Jersey, for the construction of three submarines of the coast defense type at a cost of $450,000 each for use on the Pacific coast.

The Kirby Ship Yards, Bellingham, Wash., have closed a contract with the Bellingham-Alaska Trade & Transportation Co. for the construction of a $150,000 steamer for the Bellingham-Alaska run. She will have 100 staterooms and have a capacity of 1,200 tons.

The government is urging Pacific coast builders to submit bids for two steel light ships to be known as 101 and 102, same to be for service on the Atlantic. They are to be single screw, steel, oil engine driven light

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vessels. Bids are to be received by the department up to Feb. 17.

The Northwestern Fisheries Co., Seattle, Wash., have given contract to a Seattle builder for the following:

Sternwheel steamer, 120 feet long, 30 feet beam, 5 feet 1 inch deep.

Gasoline boat, 90 feet long, 20 feet 6 inches beam, 10 feet 2 inches deep.

Two gasoline boats, 70 feet long, 16 feet beam, 7 feet 9 inches deep.

The Dominion Shipbuilding, Engineering & Drydock Co., at Vaucouver, B. C., announces that it will be ready to proceed with the construction of its shipbuilding plant and drydock on the north shore as soon as the department of public works at Ottawa approves of its dredging plans. The contract has been let to the B. C. Branitoid & Contracting Co. Plans for the machine shop building and other structures are being withheld until the dredging has been completed.

The shipyards of Nelsen & Kelz, on the East Waterway, Seattle, will be ready the first of the year for launching the $25,000 tug now under construction for the Pacific Tow Boat Co. The vessel will be equipped with a 240 horsepower Diesel engine, making her one of the most powerful of her type on the Pacific coast. The hull which is 70 feet long is almost completed. The Wilson yards on the East Waterway have started construction work on the $18,000 cannery tender, ordered by the Fidalgo Island Packing Co., and same will be ready to take the water by spring.

J. F. Duthie & Co., Seattle, have been awarded a contract for constructing the stern wheel cannery tender for the Northwestern Fisheries Co., of Seattle. The vessel will cost $32,000 and the specifications call for a wooden hull 120 ft. long and 30 ft. in beam, with a depth of hold of 5 ft., a capacity for 100 tons of fish on main deck and galley, crew and officers quarters on the upper deck. Engines of 300 horsepower will be installed. She will be fitted with a surface condenser with 750 square feet of cooling surface; one combined air and circulating pump and two boiler feed pumps, besides general service pumps; one locomotive marine type boiler of 1,800 square feet heating surface and a generating set for an electric lighting plant.

Coast Machinery Repairs

The Pictou Foundry & Machine Co., Pictou, N. S., are making repairs on three dredging plants and several tug boats.

The steamer Mae was recently purchased by James H. Elwell & Co., 17 State street, New York, and was extensively repaired.

The steamers of the Atlantic Coast Lumber Corporation, New York, are being equipped with oil tanks on the bow and stern to be used in heavy weather.

The steamer Lansing, of the Boston Ship Brokerage Co., Boston, is at the yard of the Thames Tow Boat Co., New London, Conn., for caulking and general repairs.

The steamers Beverly and Arctic, of the Philadelphia & Camden Ferry Co., Camden, N. J., will be equipped with new fire pumps shortly at a cost of about $700 each.

Samuel W. K. Brooks, East Boston, Mass., is making repairs on the following steamers: General Lincoln, Griswold, Machigome, Patchogue, Martha, Sightseer and Boston Floating Hospital.

The steamers Ramona and Coronado of the Coronado Ferry Co., San Diego, Cal., were recently overhauled, the company spending approximately $10,000 on machinery repairs, renewing life preservers and painting.

The White Collar Line, Davenport, Ia., installed the Gardner steam steerer on its steamer Morning Star last fall. W. A. Blair, the manager, said: "The steering gear is a great success. Now I have to take the pilots ashore for exercise."

The steamers City of Memphis and City of Macon, belonging to the fleet of the Ocean Steamship Co., of Savannah, New York, recently had new forecastle decks added and the pilot houses of the two vessels were elevated accordingly.

Read Bros., Fall River, Mass., are fitting a new stern on a barge for the Staples Transportation Co., the fourth job of this kind which the company has done for the Transportation company during the past year. The company does considerable repair work on oyster fleets operating in its vicinity.

Harlan & Hollingsworth Corporation, Wilmington, Del., has the following repair work on hand:

Side-wheel steamer Ida, belonging to Saugerties & New York Steamboat Co., Saugerties, N. Y., installation of boilers and general overhauling, repairing and painting.

Steamers City of Philadelphia and City of Wilmington of Wilson Line, Wilmington, Del., annual overhauling, repairing, painting, etc.

The Craig Shipbuilding Co., Long Beach, Cal., is building two submarines, L-6 and L-7, for the United States navy. The vessels are duplicate, 165 feet over all and will cost approximately $560,000 each. They will be equipped with two Busch-Sulzer engines, 1,200 horsepower.

The company is converting the steamer Navajo into a shelter deck steamer and the steamer Alvarado into a partial oil tanker.

Southern Pacific Co., West Oakland Yards, West Oakland, Cal., are busy with the following program:

Repairs to side-wheel ferry boat Garden City, belonging to Southern Pacific Co., amounting to $20,000.

Repairs to side-wheel ferry boat El Capitan of Southern Pacific fleet amounting to $15,000.

Repairs to side-wheel car ferry Solano of Southern Pacific fleet amounting to $75,000.

Repairs to stern-wheel river boat Apache of Southern Pacific fleet amounting to $33,000.

Machinery Repairs

The Johnson Iron Works, Ltd., New Orleans, La., is installing new boilers in a government light vessel, and is engaged in repair work.

Marsh & Henthorn, Ltd., Belleville, Ont., recently supplied an order of winches to the Vancouver Shipyard, Ltd., Vancouver, B. C.

International Engineering Works, Ltd., Amherst, N. S., Canada, are supplying a vertical marine boiler, 64 inches in diameter by 8 feet 6 inches for tug Wm. M. for the Dalhousie Lumber Co.

United Engineering Works, 224-32 Spear street, San Francisco, Cal., is building a 12 x 27 x 16 compound engine and one Scotch marine boiler, 250 horsepower, for steamer Paladini Bros., building by W. F. Stone, Oakland, Cal., for A. Paladini Co., San Francisco.

The Newport News Shipbuilding & Dry Dock Co., Newport News, Va., will install new boilers and make general repairs on the steamer Jefferson of the Old Dominion Steamship Co.'s fleet, New York, and is supplying new boilers for the steamer St. Johns of the Colonial Beach Co.'s fleet, Washington, D. C., as well as for the steamer Northumberland of the Maryland, Delaware & Virginia Ry. Co.'s fleet, Baltimore, Md.

The Almy Water Tube Boiler Co., Providence, R. I., is supplying boilers for the following: U. S. Lighthouse tender Fern building by Hall Bros. Marine Railway & Shipbuilding Co.; steam yacht building by Geo. Lawley & Son Corporation, Neponset, Mass.; vessel building for E. W. Bliss Co. by Bath Iron Works, Bath, Me.; tow boat building for W. H. & I. H. Chase Lumber Co., Lakeport, N. H.; steam yacht Kaleda, owned by Edward Michael, Buf-

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falo, N. Y.; boiler for Maryland Transportation Co., Baltimore, and one for Eagle Harbor Transportation Co., Seattle, Wash.

Schoellhorn-Albrecht Machine Co., St. Louis, Mo., furnished machinery for the following river boats during 1914; Str. Hustler, J. A. Ashley, owner, Glasgow, Mo.; Str. G. W. Hill, Wisherd Line, Quincy, Ill.; Str. Monator, Kansas City Bridge Co., Kansas City, Mo.; Str. Lyons, Rust & Swift, St. Louis, Mo.; steamer owned by Thompson Bros., Bonnot's Mill, Mo.; dredge McClellan, Union Sand & Material Co., St. Louis, Mo.; tug Carr, Union Sand & Material Co., St. Louis, Mo.; U. S. Snagboat Missouri, U. S. Engineer Office, Kansas City, Mo.; U. S. Snagboat Macomb, U. S. Engineer Office, Kansas City, Mo.; Str. Myrtle, Herman Ferry & P. Co., Herman, Mo.

Harlan & Hollingsworth Corporation, Wilmington, Del., is supplying the following:

One flue and return tube marine boiler and one vertical donkey boiler for Steamer Ida belonging to Saugerties & New York Steamboat Co., Saugerties, N. Y.; cost, $11,000.

One cylindrical return tube boiler for new sanitarium steamer, hull of which is being built by John W. Sullivan Co., foot E. Ninth street, New York; cost, $4,500.

Two cylindrical return tube boilers for steamer Massasoit; hull building by John W. Sullivan Co., New York; cost, $7,500.

One cylindrical return tube boiler for new tug boat. Hull building by John W. Sullivan Co., New York; cost, $10,000.

One cylindrical return tube boiler for new tug boat for Staten Island Shipbuilding Co., Port Richmond, S. I., N. Y.; cost, $7,500.

Lake Ship Building

IT is a great many years since the lake shipyards were confronted with as poor a program of shipbuilding as they are at present. In fact, the entire program consists of three tugs, a steam yacht, a passenger steamer, a car ferry and two dump scows. There is not a single bulk freighter under construction in any yard, which is a circumstance that has not obtained in many years before. This caution on the part of vessel owners is doubtless prompted by the depressed state of industry and by the further fact that it required a fairly extended movement of all commodities to keep the fleet reasonably employed throughout the year. The surplus of ships created a few years back has not yet been fully digested. Moreover, wastage during 1914 was slight, only two bulk freighters passing out of existence, while seven were added to the available fleet. The shipyards cannot expect for a year or two any considerable program in new construction though a number of the older type of vessels are being remodeled to meet the demands of the unloading machines.

VESSELS UNDER CONSTRUCTION IN LAKE SHIP YARDS FOR 1915 DELIVERY

RACINE-TRUSCOTT-SHELL LAKE BOAT CO., MUSKEGON, MICH.

To be built at	Type or name.	Dimensions in feet. Over all.	Keel.	Beam.	Depth.	Dimensions of engines, in.	Dimensions of boilers, ft. and in.	Draft.	Steam pressure, lbs.	Capacity, gross tons.	For whom building.
Muskegon..	Tug	110	...	24	12	16, 32 x 24	Scotch, 12 x 11	———	150	.....	U. S. Engineers.

POLSON IRON WORKS, TORONTO, ONT.

Toronto....	Car ferry	318	307½	56	20½	20½, 33, 54 x 36	Four, 14 x 12	———	180	5,160	Ontario Car Ferry Co., Montreal, Que.
Toronto....	Steam yacht	94	94	12	6	9, 13½, 20 x 11	Water-tube	———	300	.....	T. Eaton Co., Ltd.

COWLE'S SHIPYARD CO., BUFFALO, N. Y.

Buffalo.....	Tug	60	52	15	7½	14 x 16	———	———	...	.....	Tonawanda & Grand Island Ferry Co., Tonawanda, N. Y.

MANITOWOC SHIP BUILDING & DRY DOCK CO., MANITOWOC, WIS.

Manitowoc..	Pass. Str.	316	..	..	..	———	———	———	...	.....	Goodrich Transit Co., Chicago, Ill.

JAMES DAVIDSON, BAY CITY, MICH.

Bay City....	Dump scow	140	..	30	..	———	———	———	...	500 cu. yds.	James Davidson.
Bay City....	Dump scow	140	..	30	..	———	———	———	...	500 cu. yds.	James Davidson.

GREAT LAKES TOWING CO., CLEVELAND, O.

Cleveland...	Tug	71	..	..	..	———	———	———	...	.....	Great Lakes Towing Co.

Repairs to Lake Vessels

The John Schroeder Lumber Co., Ashland, Wis., is installing an electric light plant in the tug Saugatuck and scow Bob Cook.

The steamer George King, belonging to Wm. H. Sharp, Bay City, Mich., is receiving a thorough rebuild at Marine City.

The barge S. D. Warriner, belonging to the fleet of M. A. Hanna & Co., Cleveland, O., is being reconstructed on the Herriman plan.

The steamer Northern Wave, of the Mutual Transit Co.'s fleet, Buffalo, is at the yard of the Buffalo Dry Dock, Buffalo, receiving new deck houses.

The vessels of the Western Transit Co.'s fleet are being equipped with shutters, storm doors and oil tanks, as required by U. S. regulations.

The Hart Transportation Co., Sturgeon Bay, Wis., is rebuilding its steamer

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Bon Ami and also reboilering and overhauling the machinery on the steamer Sailor Boy.

Rieboldt, Wolter & Co., Sturgeon Bay, Wis., have just completed a thorough rebuild of the steamer Columbia, belonging to Charles S. Roe & Co., Harbor Springs, Mich.

P. F. Thrall, Green Bay, Wis., recently rebuilt the tug Menominee River, the tug now being about 85 per cent new. She is 85 feet long and of 70 gross tons.

The steamers Secandbee, City of Buffalo, City of Erie and State of Ohio of the Cleveland & Buffalo Transit Co., are being thoroughly overhauled and renovated, the company expending approximately $100,000 along this line.

The steamers L. Edward Hines, W. H. Sawyer and Niko and the barges Ashland, Case and C. E. Redfern of the Edward Hines Lumber Co.'s fleet are receiving extensive general repairs, aggregating between $30,000 and $40,000.

The Petrol Traffic Co., Toledo, O., recently purchased the steamer Viking, which is undergoing a general overhauling and will be put into commission at the opening of navigation, carrying miscellaneous cargoes and towing the barge Mitchell.

The steamer Capt. Thomas Wilson, of the Wilson Transit Co.'s fleet, Cleveland, is at the yard of the Manitowoc Ship Building & Dry Dock Co., where she is being fitted with two new Scotch boilers, 14 x 11 feet 6 inches. They are being installed on tank top with coal bunker in front. Approximate cost of alterations, $30,000.

The barge Iron Cliff, of the Pringle Barge Line, Cleveland, is at the Wolverine dry dock, Port Huron, Mich., where she is receiving new hatch beams, hatch coamings, decking, recaulking and other general repairs. The barges Golden Age, Tokio and John J. Barlum, of this fleet, are also being recaulked and repaired in a general way.

The steamer D. Dussault, of the Toledo Builders Supply Co., Toledo, O., has had intermediate gunnels put on fore and aft and has had other cabin and boiler improvements made, amounting to approximately $1,000.

The steamer Walter D., of this fleet, has also been improved with cabin and other fixtures and a new pump amounting to approximately $1,500.

The boilers of the steamer Eastland, now owned by the St. Joseph-Chicago Steamship Co., St. Joseph, Mich., are being completely overhauled, new tubes being fitted throughout, and the Eckliff automatic boiler circulators and purifiers installed. The boat deck of the steamer has been entirely recanvassed, the dining room and pantry having new Byerlyte flooring installed. Alterations will also be made in sleeping quarters, hall room and mess rooms.

The steamers Saranac and Tuscarora, of the Lehigh Valley Transportation Co.'s fleet, are undergoing extensive alterations at the Ecorse plant of the Great Lakes Engineering Works, under the supervision of Babcock & Penton, Cleveland and New York. This firm of naval architects is also remodeling the steamer W. L. Brown, of the Republic Transportation Co.'s fleet, at the yard of the Manitowoc Ship Building & Dry Dock Co., Manitowoc, Wis.

Walter H. Oades, foot of Dubois street, Detroit, Mich., has scheduled the following repair work:

Scow Gay Haven receiving new 8-inch fir bulwarks on both sides, together with steel arches of ¾ x 20-inch steel plate as a chord and ⅝ x 12-inch steel diagonals.

Steamer Viking receiving new stanchions aft, new main rail and partial renewal of floor in hold.

Steamer Annie Laura receiving new bed timbers and frames aft; also having engine installed.

The steamers Venus and Neptune, of the Interlake Steamship Co.'s fleet are being reconstructed at the yard of the Manitowoc Ship Building & Dry Dock Co., Manitowoc, Wis., making them arch construction and spacing the hatches 12 feet fore and aft with 24 foot centers.

The steamer John Sherwin, of this fleet, is at the yard of the Toledo Ship Building Co., Toledo, O., her hatches being changed from 9 feet fore and aft to 12 feet fore and aft, installing steel covers, and also putting in a screen bulkhead forward.

The steamer Georgia, of the Goodrich Transit Co.'s fleet, Chicago, underwent extensive alterations recently at the yard of the Manitowoc Ship Building & Dry Dock Co., and was fitted with new Scotch boilers with Howden forced draft.

The steamer Indiana, of this fleet, is also at the Manitowoc yard, being lengthened 22 feet. The changes made in the steamer will increase her freight capacity 40 per cent and her rooming capacity for passengers 30 per cent. She will be re-boilered with two Scotch boilers, Howden draft, and will be equipped with a sprinkler plant for fire protection.

The Marine Iron & Ship Building Works, Duluth, Minn., are repairing the engines of the following steamers: Muncy, Anchor Line; Hebard, Wilson Transit Co.; L. R. Davidson, John J. Boland and Wickwire, of Boland & Cornelius' fleet; Thomas Walters and A. D. Thompson, of W. H. Becker fleet; Q. A. Shaw, L. C. Hanna, of Hanna & Co.'s fleet; Joseph Sellwood and M. A. Hanna, of John Mitchell fleet.

The company is also rebuilding the yacht Vidette, owned by Christianson Bros., of Duluth, from keel up and are putting on new cabins.

The scow Tangent, owned by Barnett & Record Co., Duluth, is also being rebuilt. This scow went ashore near Bayfield early last fall and is 160 feet long, 36 feet wide and 9 feet deep.

The steamer Presque Isle, of the Cleveland-Cliffs Iron Co.'s fleet, Cleveland, is undergoing extensive alterations through the reconstruction of her decks and cargo hold on what is known as the Herriman system of reconstruction, by enlarging the hatch openings to 12 feet in length fore and aft, removing the present hold beams and stanchions and fitting combined plate hatch coamings and deck girders with diagonal plate struts from deck girders to main deck stringers, with plate web frames from main deck stringer to tank top, forming transverse members spaced 12 feet apart. Hatches to be fitted with sliding steel plate covers and all fittings. New pilot house and texas to be built on forecastle deck; new dunnage room; new bulkhead forward; cement bilge ceilings; new tank top. This work necessitates the removing of the forward deck house.

The steamer Angeline, of this fleet, is also undergoing reconstruction of her decks and cargo hold on the Herriman system by enlarging the hatch openings to 12 feet in length fore and aft, removing the present hold beams and stanchions and fitting combined plate hatch coamings and deck girders with diagonal plate struts from deck girders to main deck stringer, with plate web frames from main deck stringer to tank top, forming transverse members spaced 12 feet apart. Hatches are to be fitted with sliding steel plate covers and all fittings. New upper pilot house to be built on top of present pilot house; new dunnage room; new bulkhead forward; cement bilge ceilings.

The additional particulars of the Canadian car ferry Leonard, which were published in the January MARINE REVIEW, supplemented to its December article were obtained from *Engineering*, London.

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Shipbuilding During 1914

AMERICAN ship builders turned out a slightly larger tonnage in 1914 than in the previous year; the total was 270,962 tons, against 265,580 tons in 1913. A large proportion of the tonnage was for the government, including battleships, submarines and destroyers. Tonnage built on the Lakes and Pacific coast was light. Among the more notable vessels were the Cramp-built steamers Great Northern and Northern Pacific for service between the Pacific and Atlantic seaboards. The legislative program and the opening of the Panama canal have not as yet had any appreciable effect on the ship building of the country.

	——1914——			1913.
	Ves.	Tons.	I. H. P.	Tons.
Dockyard vessel...	1	7,200	5,200	465
N. Y. S. B. Co....	9	44,905	48,450	35,391
Fore River Co.....	7	41,084	47,700	6,811
Newp't News Co...	11	38,987	16,500	53,238
Maryl'd Steel Co..	9	29,046	15,690	32,442
W. Cramp & Sons.	6	22,359	106,500	24,947
Amer. S. B. Co....	5	21,929	9,050	25,485
Union Iron Wks...	8	20,252	13,800	3,808
Gt. Lakes Wks....	9	16,598	6,955	11,288
Amer. Car Co.....	16	10,451	.....	10,400
Harlan & H'wth...	5	5,252	4,520	12,857
Craig S. B. Co....	1	1,522	875	6,848
Perth Amboy Co..	23	1,500	.....	3,500
Staten Isl'd Co....	5	1,345	3,800	3,482
Bath Ironworks....	2	1,190	16,000	2,346
Johnston Bros.....	5	1,077	.....	.....
The Seattle Co....	3	750	2,400	4,602
Other firms.....	31	5,515	975	25,195
New London Co....	.	.....	6,900	.....
W. & A. Fl'tch'r Co.	.	.....	1,600	1,300
Un. Eng. Works...	.	.....	550	1,184
	156	270,962	306,465	265,589

U. S. NAVY YARD, MARE ISLAND, CAL.

Vessel and type—Registry.	Tons.
Kanawha—T.s. oil tanker, U. S. gov...	7,200

THE NEW YORK SHIP BUILDING CO., CAMDEN, N. J.

Oklahoma—Battleship, U. S. gov't.....	27,000
Ericsson—Destroyer, U. S. Gov't.....	1,050
Gulflight—Oil tanker, Port Arthur.....	5,350
Gulfstream—Oil tanker, Pt. Arthur....	5,350
Mayor Gaynor—Ferry, New York.....	1,355
4 vessels—Car floats, New York.....	4,800

Total—9 vessels of 44,905 tons and engines of 48,450 indicated horsepower.

THE FORE RIVER CO., QUINCY, MASS.

Nevada—Battleship, U. S. Gov't.....	27,500
Cushing—Destroyer, U. S. Gov't.....	1,050
K 5—Submarine, U. S. Gov't.....	519
K 6—Submarine, U. S. Gov't.....	519
Fulton—Sub. tender, U. S. Gov't.....	700
Atlantic—Cargo, Boston	5,398
Pacific—Cargo, Boston	5,398

Total—7 vessels of 41,084 tons and engines of 47,700 indicated horsepower.

THE NEWPORT NEWS SHIP BUILDING CO.

Edward Pierce—Collier, Boston.....	4,387
J. D. Archbold—Oil tank, Bayonne....	8,374
J. D. Rockefeller—Oil tank, Bayonne..	8,374
Neches—Cargo, New York.....	5,426
Medina—Cargo, New York.....	5,426
2 vessels—Oil barges, U. S. Gov't....	4,000
4 vessels—Dump scows, U. S. Gov't...	3,000

Total—11 vessels of 38,987 tons and engines of 15,500 indicated horsepower.

THE MARYLAND STEEL CO., BALTIMORE.

Iowan—Cargo, New York.....	6,649
Ohioan—Cargo, New York.....	6,649
Ulysses—Collier, Baltimore	10,650
2 vessels—Lighters, New York.....	1,098
4 vessels—Dump barges, Baltimore....	4,000

Total—9 vessels of 29,046 tons and engines of 15,690 indicated horsepower.

THE WM. CRAMP & SONS CO., PHILADELPHIA.

O'Brien—Destroyer, U. S. Gov't.....	1,050
Nicholson—Destroyer, U. S. Gov't.....	1,050
Winslow—Destroyer, U. S. Gov't.....	1,050
Gt. Northern—3 sc. turbine, Astoria....	8,255
Northern Pacific—3-sc. turbine, do.....	8,255
Henry M. Flagler—T.s. car ferry, Key West	2,699

Total—6 vessels of 22,559 tons and 106,500 indicated horsepower.

UNION IRON WORKS, SAN FRANCISCO.

K3, K7, K8—Submarines, U. S. Gov't.	1,500
Frank H. Buck—Oil tank, San Fran...	6,076
Lyman Stewart—Oil tank, Seattle.....	6,076
J. A. Moffett—Oil tank, Richmond....	6,000
Barge No. 8—Oil barge, not stated....	500
1 vessel—Caisson, Panama	100

Total—8 vessels of 20,252 tons and engines of 13,800 indicated horsepower.

AMERICAN CAR & FOUNDRY CO., WILMINGTON, DEL.

Charles M'Neill—Tug, New York.....	50
Chief—Harbor barge, New York.....	375
4 vessels—Sea barges, Wilmington.....	3,776
5 vessels—Car ferries, New York.....	3,500
5 vessels—Dump scows, New York....	2,750

Total—16 vessels of 10,451 tons.

HARLAN & HOLLINGSWORTH CORP'N., WILMINGTON.

Francis Hanify—Coaster, S. Fran.....	2,700
Delaware—Ferry, Camden, N. J.....	807
Hanover—Paddle, Madisonville	467
Weehawken—Ferry, New York.....	1,020
Commonwealth—Elevator, Phila.	258
3 vessels (engines only).....	.....

Total—5 vessels of 5,252 tons and engines of 4,520 indicated horsepower.

UNION GAS ENGINE CO., SAN FRANCISCO.

17 vessels—Gas engines, American.....	.....

CRAIG SHIP BUILDING CO., LONG BEACH, CAL.

Alvarado—S.s., Bath, Me.....	1,522

PERTH AMBOY DRY DOCK CO.

23 vessels—Lighters, American.....	1,500

STATEN ISLAND CO., PT. RICHMOND, N. Y.

W. J. Davidson—Tug, New York.....	177
Bristol—Tug, Fall River.....	284
Gorgona—Tug, Colon	450
No. 632—Tug, New York.....	150
No. 642—Tug, New York.....	284

Total—5 vessels of 1,345 tons and 3,800 indicated horsepower.

THE BATH IRON WORKS, BATH, ME.

MacDougall—Destroyer, U. S. Gov't...	1,010
Defiance—Racing yacht, American.....	180

Total—2 vessels of 1,190 tons and engines of 16,000 indicated horsepower.

SEATTLE CONSTRUCTION & DRY DOCK CO.

3 vessels—Twin-screw tugs, U. S. Gov't.	750

HERRESHOFF MFG. CO., BRISTOL, R. I.

Vagrant—Steam yacht, New York.....	217
Katoma—Steam yacht, New York.....	313
Resolute—Racing yacht, American.....	98

Total—3 vessels of 628 tons.

F. S. BOWKER & SON, PHIPPSBURG, ME.

Albert H. Willis—Sch., Boston.....	564

W. G. ABBOTT, MILFORD, DEL.

2 vessels—Steam fishers, Milford.....	538

GEORGE LAWLEY & SON, CORP., BOSTON.

Gem—Twin-screw, New York.....	226
Kirin—Motor schooner, Newport.....	212

Total—2 vessels of 438 tons and engines of 450 indicated horsepower.

SKINNER SHIP BUILDING CO., BALTIMORE

Radium—Motor barge, Pt. Arthur.....	339

DUBUQUE BOAT & BOILER WORKS, IOWA.

Warrioto—Stern wheel, Nashville.....	250

NEW LONDON SHIP & ENGINE CO., GROTON, CONN.

Vessel and Engines—Builders.	
Fulton—Oil engines, The Fore River Co.	
K5, K6—Oil engines, the Fore River Co.	
K4—Oil engines, Seattle Construction Co.	

Total—Engines of 6,900 horsepower for 4 vessels.

W. & A. FLETCHER CO., HOBOKEN, N. J.

Weehawken—Comp. ferry, Harland & Hollingsworth	1,600

Lake Machinery Orders

William Kennedy & Sons Ltd., Owen Sound, Ont., are engaged in making propeller wheels for a ferry steamer being built by the Polson Iron Works, Ltd., Toronto. The wheels are 12 feet 2 inches in diameter, with steel hubs and high class semi-steel blades. The company is also making a full line of patterns for propellers for the freight vessels of The Canada Steamship Lines, Ltd., and a number of propellers for sundry boats are being repaired. They are also reboring and bushing the high pressure cylinder of the tug Harrison.

The Kingsford Foundry & Machine Works, Oswego, N. Y., recently built and are now building the following marine boilers:

Capt. A. R. Hinckley, Oswego, N. Y., compact marine boiler, for installation in steamer McCormick.

Benj. L. Cowles, Buffalo, N. Y., following boilers; one compact marine for yard No. 44. One compact marine for yard No. 45. One compact marine for J. F. Schoellkopf.

Hickler Bros., Sault Ste. Marie, Mich., one compact marine boiler, for installation in tug Thomas Friant.

Zaldo & Martinez, New York City, one Scotch marine boiler, for installation in steamer Isabel.

Norfolk Dredging Co., Norfolk, Va., one leg marine boiler, for installation in tug Chowan.

Eastern Dredging Co., Boston, Mass., two dredge type boilers, for installation in dredge Suffolk.

A. G. Granger Co., 90 West street, New York City, one leg type double furnace dredge boiler.

H. H. Colle, Pascagoula, Miss., Scotch marine boiler, for installation in hull built on yard No. 60.

Wm. G. Abbott, Milford, Del., one vertical marine boiler, for installation in hull built on yard No. 90.

Thames Tow Boat Co., New London, Conn., one Doghouse type boiler, for installation in tug Aquidneck.

U. S. Engineer Office, New Orleans, La., one vertical boiler, for installation on levee machine Barataria.

McCaldin Bros., 81 Broad street, New York City, leg marine boiler, for installation in steamer McCaldin Bros.

Washington Brick & Terra Cotta Co., Washington, D. C., one eclipse marine boiler, for installation in steamer John Miller.

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Lake Launchings During 1914

DURING 1914, exclusive of Canadian yards, lake shipyards launched 33 vessels, of which six were for the bulk freight trade of the great lakes, two passenger steamers, four were dredges, two were small one is of Canadian canal size, have a carrying capacity of 51,000 gross tons on a single trip. In addition to this list the Collingwood Ship Building Co. launched the 10,000-ton bulk freighter J. H. G. Hagarty for the St. Lawrence were passenger steamers, five were dredges and the remainder a variety of floating property. Of the four bulk freighters, two were of Canadian canal dimensions and the other two of 10,000 and 12,000 tons each, mak-

TABLE OF LAKE LAUNCHINGS DURING 1914.

AMERICAN SHIP BUILDING CO.

Where built.	Type.	Name of Vessel.	Length over-all, ft.	Carrying capacity, gross tons.	Name and Address of Owner.
Lorain	Bulk Frtr.	Robert L. Ireland	524	9,000	Kinney Steamship Co., Cleveland.
Port Arthur	Bulk Frtr.	W. Grant Morden	625	12,000	Canada Steamship Lines, Ltd., Toronto.
Lorain	Bulk Frtr.	W. D. Crawford	524	9,000	Virginia Steamship Co., M. A. Hanna & Co., Mgrs., Cleveland.
Cleveland	Bulk Frtr.	H. M. Hanna Jr.	524	9,000	W. C. Richardson & Co., Cleveland.
Wyandotte	Bulk Frtr.	Adrian Iselin	257	3,000	George Hall Coal Co., Ogdensburg, N. Y.
Lorain	Sand Steamer	Kelley Island	175	.....	Kelley Island Lime & Transport Co., Cleveland.

GREAT LAKES ENGINEERING WORKS., DETROIT, MICH.

Ecorse	Self-unloading Str.	Huron	439	8,000	Wyandotte Transportation Co., Detroit, Mich.
Ecorse	Pass. Str.	South American	315	540 Pass.	Chicago, Duluth & Georgian Bay Transp. Co., Chicago.
Ashtabula	Bulk Frtr.	Wm. H. Donner	524	9,000	Mahoning Steamship Co., M. A. Hanna & Co., Mgrs., Cleveland.
Ecorse	Freighter	International	256	3,000	J. L. Crosthwaite, New York, N. Y.
Ashtabula	Dump Scow	————	150	.....	Edward Gillen Dock, Dredge & Const. Co., Racine, Wis.
New Orleans	Barges No. 5, 6, 7 and 8, duplicates.	————	240	.....	Alabama & New Orleans Transp. Co., New Orleans, La.

COLLINGWOOD SHIP BUILDING CO., COLLINGWOOD, ONT.

Collingwood	Bulk Frtr.	J. H. G. Hagarty	550	10,000	St. Lawrence & Chicago Steam Nav. Co., Toronto, Ont.
Collingwood	6-pocket Dump Scow	————	130	.....	Boone Dredging & Const. Co., Toronto, Ont.

MANITOWOC SHIP BUILDING & DRY DOCK CO., MANITOWOC, WIS.

Manitowoc	Tug	Alice Stafford	87½	.....	Erie Land & Improvement Co., Chicago, Ill.
Manitowoc	Tug	Timothy J. O'Byrne	80	.....	Lincoln Park Commissioners, Chicago, Ill.
Manitowoc	Hydraulic Dredge	Charles M. Hall	135	.....	St. Lawrence River Power Co., Massena, N. Y.
Manitowoc	Dipper Dredge	Richard B. Mellen	116	.....	St. Lawrence River Power Co., Massena, N. Y.

JOHNSTON BROS., FERRYSBURG, MICH.

Ferrysburg	Passenger	Ottawa	64.10	75	Grand Rapids, Holland & Chicago Ry., Holland, Mich.
Ferrysburg	Tug	American	81½	88	American Construction Co., Cleveland, O.
Ferrysburg	Tug	Philip T. Dodge	71	68	International Paper Co., Niagara Falls, N. Y.
Ferrysburg	Dredge	Yuba No. 3	131.2	425	Yuba Construction Co., Marysville, Cal.
Ferrysburg	Dredge	Yuba No. 4	131.2	425	Yuba Construction Co., Marysville, Cal.

RACINE-TRUSCOTT-SHELL LAKE BOAT CO., MUSKEGON, MICH.

Muskegon	Survey Str.	Paquipe	83	.....	U. S. Government, Atlantic Coast Service.
Muskegon	Cruiser	————	83	.....	U. S. Engineer Dept.
Muskegon	U. S. Eng. Cruiser.	Monomoy	83	.....	U. S. Government.
Muskegon	Lightship	No. 98	101	.....	U. S. Government, Bureau of Lighthouses.
Muskegon	Lightship	No. 96	101	.....	U. S. Government, Bureau of Lighthouses.

POLSON IRON WORKS, TORONTO, ONT.

Toronto	Buoy Str.	Grenville	164½	.....	Canadian Government, Dept. of Marine and Fisheries.
Toronto (Erected at Nelson, B. C.)	Car Barge	Transfer No. 5	...	.....	Canadian Pacific Railway.
Toronto	Three Scows	Q. H. C., Nos. 51, 52 and 53	145	500 cu. yds.	Quebec Harbor Commissioners.
Toronto	Three Scows	Q. H. C., Nos. 54, 55 and 56	108	300 cu. yds.	Quebec Harbor Commissioners.
Toronto	Three Lighters	H. B. T., Nos. 1, 2 and 3.	128	.....	Canadian Government, Dept. of Public Works.
Toronto	Scow	Derrick Scow	120	.....	Canadian Stewart Co., Ltd., Toronto, Ont.
Toronto	Suction Dredge	Cyclone	170	.....	Canadian Stewart Co., Ltd., Toronto, Ont.
Toronto	Suction Dredge	Tornado	170	.....	Canadian Stewart Co., Ltd., Toronto, Ont.

LAKE SHIPBUILDING CO., BUFFALO, N. Y.

Buffalo	Scow	Ox	50	.....	Lake Shipbuilding Co.
Buffalo	Scow	Bull	60	.....	Lake Shipbuilding Co.
Buffalo	Rudder Scow	No. 5	35	.....	Lake Shipbuilding Co.

COWLES' SHIPYARD CO., BUFFALO, N. Y.

Buffalo	Ice-breaking Tug	Samuel J. Dark	75	.....	Benjamin L. Cowles, Buffalo.
Buffalo	Ice-breaking Tug	Arthur Schoellkopf	48	15	Hydraulic Power Co., Niagara Falls, N. Y.

GREAT LAKES TOWING CO., CLEVELAND, O.

Cleveland	Tug	Wisconsin	..	.....	Great Lakes Towing Co., Cleveland, O.
Cleveland	Tug	Illinois	..	.....	Great Lakes Towing Co., Cleveland, O.
Cleveland	Tug	Virginia	..	.....	Great Lakes Towing Co., Cleveland, O.

cruisers for government engineers, one survey steamer, nine were tugs, two lightships, one package freighter of Canadian canal size, one conveying steamer, one sand steamer and four scows.

These six bulk freighters, of which & Chicago River Steam Navigation Co. of Toronto.

During 1913, exclusive of Canadian yards, lake shipyards lauched 32 vessels of which four were bulk freighters, five were oil tankers for the coast, two ing the combined carrying capacity on a single trop 28,000 tons, or 560,000 tons in an average season of 20 trips.

During 1912, exclusive of Canadian yards, lake shipyards launched five bulk freighters having a carrying capacity of

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48,000 tons on a single trip, or 960,000 tons in an average season.

During 1911, exclusive of Canadian yards, lake ship yards launched 42 vessels, of which nine were bulk freighters (four for coast service), two package freighters for coast service, two passenger steamers, two oil steamers, five oil barges, eight tugs, one fuel lighter, one sand steamer, one car ferry, three tow boats, four scows, two light vessels, one river lighter and one car float.

The five lake bulk freighters have a carrying capacity of 55,000 gross tons of ore in a single trip, or 1,100,000 tons in an average season of 20 trips.

During 1910, exclusive of Canadian yards, lake ship yards launched 51 vessels, of which 20 were bulk freighters, three package freighters, two passenger steamers, three car ferries, one river ferry, one lumber steamer, 12 tugs, three lighters, one lighthouse tender, one sand sucker, two dump scows and two gold dredges. Of this program the American Ship Building Co. launched 24, of which ten were bulk freighters, one passenger boat, six tugs, thre package freighters, two car ferries, one river ferry and one lighter, The Great Lakes Engineering Works launched nine bulk freighters; the Toledo Ship Building Co. one lumber steamer; the Manitowoc Dry Dock Co. two lighters, one sand sucker and two dump scows; the Racine Boat Mfg. Co., one lighthouse tender; Johnson Bros., five fish tugs and two gold dredges; and Robert Curr, at Cleveland, built and launched a tug from Murphy & Donnelly's boiler shop.

The 20 bulk freighters have a carrying capacity of 194,500 gross tons in a single trip, or 3,890,000 gross tons in an average season of 20 trips.

During 1909, the lake ship yards, exclusive of Canadian yards, launched 39 vessels, of which 17 were bulk freighters, five were package freighters, five passenger steamers, six tugs, five lighters and one survey boat.

During 1908, exclusive of Canadian yards, lake ship yards launched 39 vessels, of which 24 were bulk freighters, two passenger boats, one package freighter, three tugs, three fire boats, one lightship, two drill boats, one sand sucker and one supply boat.

These 24 bulk freighters have a carrying capacity of 101,400 tons on a single trip, or 2,028,000 tons in an average season.

During 1907 the lake ship yards exclusive of Canadian yards, launched 56 vessels, of which 40 were bulk freighters, three package freighters, one passenger steamer, one wrecker, one lighter, one mail boat, five tugs and four scows. These 40 bulk freighters have a carrying capacity of 368,000 gross tons on a single trip. However, as one of the new steamers, the Cyprus, sank on her second trip, the net addition of that year was 361,000, or 7,220,000 tons in an average season.

During 1906, the ship builders of the great lakes, exclusive of the Canadian yards, launched 47 vessels, of which 40 were bulk freighters, two passenger steamers, two package freighters, two car ferries and one sand dredge. The 40 bulk freighters have a carrying capacity of 381,000 tons on a single trip, or 7,620,000 gross tons in an average season of 20 trips.

During 1905, the ship builders of the great lakes launched 32 steamers, of which 29 were bulk freighters, two package freighters and one car ferry. These 29 bulk freighters have 260,200 gross tons carrying capacity on a single trip, or 5,204,000 gross tons in an average season of 20 trips.

During 1904 lake shipyards launched 13 vessels, of which seven were bulk freighters, two package freighters, one car ferry and three passenger steamers. The seven bulk freighters have a carrying capacity of 51,300 tons on a single trip, or 1,026,000 in an average season of 20 trips.

During 1903, lake shipyards launched 50 vessels, of which 42 were bulk freighters, five car ferries and three passenger steamers. These 42 bulk freighters have a carrying capacity of 213,250 tons on a single trip, or 4,265,000 tons in an average season of 20 trips. It should be stated, however, that ten of the freighters were built by Mr. Wolvin for St. Lawrence river trade and are actively engaged in that service, but as they are available for the ore trade, they have been classed as bulk freighters with an average capacity of 3,000 tons each on 18-foot draught.

During 1902, the lake ship yards launched 41 vessels, of which 32 were bulk freighters (two of them barges), two passenger steamers, three package freighters, two car ferries and two vessels for salt water service. These 32 bulk freighters have a carrying capacity of 171,910 tons on a single trip, or 3,438,200 tons in an average season of 20 trips.

Lake Ship Building Since 1902

SHIP BUILDING for the bulk freight trade of the great lakes has been notably quiet during the past four years, but the situation which presents itself on the opening of 1915 is most singular, and is one which has not been encountered for many years. There is not a single ship now building anywhere on the lakes for the bulk freight trade. The cause of this undoubtedly lies in the greatly lessened movement of freight which marks the year 1914 and which naturally discouraged expansion. This situation, however, can only be regarded as temporary as the trade of the lakes is bound to expand. During the past decade, however, a great deal of floating property has been added to lake equipment, and contrary to the general belief, the greater part of it has been for independent interests, that is to say, for vessel owning interests simply and not for interests that own their own mines and furnaces.

From the beginning of 1902 to the close of 1914 inclusive, vessels aggregating 1,281,600 gross tons carrying capacity on a single trip have been built for independent interests as against vessels having a carrying capacity of 883,000 gross tons on a single trip for interests that have their own mines or furnaces or both.

There is appended herewith a list of bulk freighters constructed on the lakes since 1902. Since the construction of the Wolvin in 1904, only one vessel less than 400 feet in length (the R. W. England) has been built on the great lakes for the bulk freight trade, except, of course, the canalers, while 38 vessels of the 400-foot class and over, 112 vessels of the 500-foot class and over and 32 vessels of the 600-foot class and over have been built.

BULK FREIGHTERS BUILT SINCE 1902

Year 1902.

Name.	Length overall, feet.	Carrying capacity, gross tons.
A. G. Brower	366	4,800
G. J. Grammer	366	4,800
E. M. Saunders	400	5,500
W. H. Gratwick	436	6,200
W. W. Brown	366	4,800
H. S. Wilkinson	390	5,000
James Gayley	436	6,200
Bransford	436	6,200
Etruria	434	6,200
Sonora	366	4,800
Sultana	366	4,800
C. W. Watson	400	5,500
F. W. Hart	400	5,500
Wm. Nottingham	400	5,500
A. E. Stewart	376	5,000
Luzon	366	4,800
Steel King	400	5,500
Wm. F. Fitch	366	4,800

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Name.	Length overall, feet.	Carrying capacity, gross tons.
W. C. Richardson	374	4,900
L. C. Smith	434	6,200
J. M. Jenks	434	6,200
Harold B. Nye	400	5,500
Panay	366	4,800
James H. Hoyt	376	5,000
Frank H. Goodyear	436	6,200
Moses Taylor	436	6,200
George B. Leonard	400	5,500
H. B. Hawgood	434	6,200
John B. Cowle	440	6,500
Charles Beattle	220	2,000
Thomas Adams	376	5,000
Year 1903.		
James S. Keefe	255	2,800
W. H. Mack	374	4,900
Hurlburt W. Smith	434	6,200
Sinaloa	436	6,200
Robert Wallace	255	2,800
Anna C. Minch	400	5,500
Monroe C. Smith	400	5,500
C. M. Warner	390	5,250
John Lambert	255	2,800
B. Lyman Smith	400	5,500
D. G. Kerr	468	6,900
Saxona	436	6,200
John Sharples	255	2,800
Wilbert L. Smith	400	5,500
John Crerar	255	2,800
Albert M. Marshall	255	2,800
H. G. Dalton	255	2,800
D. M. Clemson	468	6,900
Louis Woodruff	436	6,200
A. D. Davidson	255	2,800
George C. Howe	255	2,800
S. N. Part	255	2,800
James H. Reid	468	6,900
G. Watson French	376	5,000
Sonoma	436	6,200
F. W. Gilchrist	436	6,200
J. L. Weeks	436	6,200
R. L. Ireland	436	6,200
R. E. Schuck	436	6,200
P. P. Miller	375	4,900
Western Star	435	6,200
Perry G. Walker	436	6,200
J. C. Gilchrist	436	6,200
Henry S. Sill	436	6,200
Wisconsin	434	6,200
Edwin F. Holmes	434	6,200
F. B. Squire	430	6,200
Winnebago	234	2,100
John O. Howard	241	2,500
George L. Craig	404	5,600
Kensington	380	5,000
Year 1904.		
Umbria	440	6,500
Francis Widlar	436	6,200
Augustus B. Wolvin	560	10,000
Sahara	494	8,000
Martin Mullen	436	6,200
Ball Brothers	500	8,000
R. W. England	376	5,000
Year 1905.		
Francis L. Robbins	400	5,500
James C. Wallace	552	10,000
Phillip Minch	500	8,000
Sylvania	524	9,000
Amasa Stone	545	10,000
L. C. Hanna	524	9,000
E. H. Gary	569	10,500
S. M. Clement	500	8,000
Socapa	524	9,000
Lyman C. Smith	545	10,000
W. E. Corey	569	10,500
W. A. Paine	500	8,000
W. A. Rogers	545	10,000
Powell Stackhouse	524	9,000
H. C. Frick	569	10,500
John Stanton	524	9,000
Joseph G. Butler Jr.	545	10.000
Pendennis White	436	6,200
W. K. Bixby	500	8,000
James B. Wood	534	9,500
James E. Davidson	524	9,000
George H. Russell	484	7,600
Hoover and Mason	524	9,000
Peter White	524	9,000
Frank J. Hecker	484	7,600
W. G. Mather	531	9,300
Frank C. Ball		10,000
B. F. Jones	5[illegible]	10,000
James P. Walsh	500	8,000
Year 1906.		
Joseph Sellwood	545	10,000
E. D. Carter	524	9,000
Charles S. Hebard	524	9,000
Loftus Cuddy	545	10,000
Abraham Stearn	545	10,000
David Z. Norton	500	8,000
John Sherwin	534	9,500
Harry Coulby	569	10,500
Harvey D. Goulder	545	10,000
J. Pierpont Morgan	600	12,000
Henry B. Smith	545	10,000
Sir Thomas Shaughnessy	500	8,000
E. J. Earling	545	10,000
Charles Weston	569	10,500
Henry H. Rogers	600	12,000
Wm. G. Pollock	400	6,500
J. Q. Riddle	552	10,000
Joshua Rhoades	440	6,500
A. Y. Townsend	602	12,000
Norman B. Ream	600	12,000
Henry A. Hawgood	552	10,000
Wm E. Fitzgerald	440	6,500
D. R. Hanna	552	10,000
Peter A. B. Widener	600	12,000
James S. Dunham	400	6,500
D. J. Morrell	602	12,000
Samuel Mather	550	10,000
Sheldon Parks	552	10,000
James F. Morrow	440	6,500
Gen. Garretson	540	10,000
W. B. Kerr	605	12,000
William P. Snyder	550	10,000
James Laughlin	550	10,000
Michigan	550	10,000
Ishpeming	550	10,000
E. L. Wallace	445	6,700
J. H. Sheadle	550	10,000
John Mitchell	440	6,500
Eugene Zimmerman	500	8,000
Sierra	458	6,800
Year 1907.		
Mathew Andrews	552	10,000
Hugh Kennedy	552	10,000
J. H. Bartow	524	9,000
Thomas Lynch	600	12,000
H. P. McIntosh	540	10,000
Henry Phipps	600	12,000
Leland S. DeGraff	605	12,000
George F. Baker	600	12,000
Charles O. Jenkins	524	9,000
Hemlock	440	6,500
Wm. M. Mills	605	12,500
Jay C. Morse	552	10,000
Odonah	440	6,500
Calumet	440	6,500
Cyprus	440	6,500
Salt Lake City	552	10,000
Crete	440	6,500
Ward Ames	552	10,000
J. J. Sullivan	552	10,000
Edwin N. Ohl	440	6,500
Arthur H. Hawgood	569	10,500
Verona	440	6,500
Wm. A. Hawgood	552	10,000
Adriatic	440	6,500
H. P. Bope	552	10,000
Elba	440	6,500
Charles W. Kotcher	440	6,500
Thomas Barlum	500	8,000
Caldera	524	9,000
Thomas F. Cole	605	12,000
D. O. Mills	552	10,000
Wm. B. Davock	440	6,500
Wilpen	574	11,000
Milinokett	524	9,000
John L. Boland	500	8,000
Josiah G. Munro	552	10,000
Jacob T. Kopp	500	8,000
Charles Hubbard	460	6,800
Smith Thompson	458	6,800
John Dunn Jr.	524	9,000
Year 1908.		
B. F. Berry	569	10,500
Wainwright	440	6,500
J. J. H. Brown	452	6,700
John A. McGean	440	6,500
J. E. Upson	524	9,000
Wm. H. Truesdale	452	6,700
A. W. Thompson	524	9,000
A. E. Nettleton	545	10,000
William H. Wolff	524	9,000
Rufus P. Ranney	440	6,500
Howard M. Hanna Jr.	500	8,000
John A. Donaldson	400	5,500
W. R. Woodford	552	10,000
Price McKinney	452	6,700
J. F. Dursten	452	6,700
Honduras	256	2,800
Normania	440	6,500
M. A. Bradley	480	7,500
Harry A. Berwind	557	10,000
William Livingstone	557	10,000
Adam E. Cornelius	440	6,500
James Corrigan	550	10,000
Daniel B. Meacham	550	10,000
Theodore H. Wickwire	464	6,800
Fred G. Hartwell	524	9,000
Year 1909.		
Alva C. Dinkey	600	12,000
Eugene J. Buffington	600	12,000
Alpena	374	5,000
La Belle	524	9,000
Andrew S. Upson	400	5,500
John J. Barlum	524	9,000
Benjamin Noble	256	2,800
Isaac M. Scott	524	9,000
G. A. Tomlinson	524	9,000
J. S. Ashley	524	9,000
Wm. B. Schiller	600	12,000
John P. Morgan Jr.	600	12,000
A. A. Augustus	524	9,000
Clifford F. Moll	464	6,800
Shenango	607	12,000
Denmark	460	6,700
Year 1910.		
Leonard B. Miller	524	9,000
John P. Reiss	524	9,000
John B. Cowle	545	10,000
Charles L. Hutchinson	524	9,000
Joseph Wood	524	9,000
A. M. Byers	524	9,000
Charles S. Price	524	9,000
E. H. Utley	524	9,000
Peter Reiss	524	9,000
W. C. Moreland	600	12,000
Ontario	465	6,800
Champlain	465	6,800
Harry E. Yates	550	10,000
St. Clair	465	6,800
Theo. H. Wickwire Jr.	550	10,000
W. J. Olcot	605	12,000
Wm. B. Dickson	605	12,000
Wm. P. Palmer	600	12,000
Willis L. King	600	12,000
Norway	524	9,000
Year 1911.		
Wm. C. Agnew	552	10,000
Thomas Walters	600	12,000
Quincy A. Shaw	524	9,000
The Harvester	545	10,000
Col. J. M. Schoonmaker	617	14,000
Year 1912.		
W. P. Snyder Jr.	617	14,000
Louis R. Davidson	524	9,000
Year 1913.		
James Farrell	600	12,000
Percival Roberts Jr.	600	12,000
Richard Trimble	600	12,000
James Carruthers	559	9,500
A. C. Dustin	545	9,000
A. D. MacTier	257	3,000
F. P. Jones	257	3,000
Year 1914.		
R. L. Ireland	524	9,000
W. Grant Morden	625	12,000
W. D. Crawford	524	9,000
H. M. Hanna Jr.	524	9,000
Adrian Iselin	257	3,000
Wm. H. Donner	524	9,000
J. H. G. Hagarty	550	10,000

New Dry Dock at South Chicago

The American Ship Building Co., Cleveland, has given contract to the Great Lakes Dredge & Dry Dock Co. for the construction of a dry dock 700 feet long and 102 feet wide at its South Chicago yard. Work will be started at once and the dock is scheduled to be completed by Sept. 15 next. The present dock at South Chicago is 564 feet long and 70 feet wide. The new dock will enable the plant to take care of any steamer trading to Lake Michigan ports. Hitherto the 600-foot ships have had to go to either Lake Erie or Lake Superior when in need of repairs to bottom damage.

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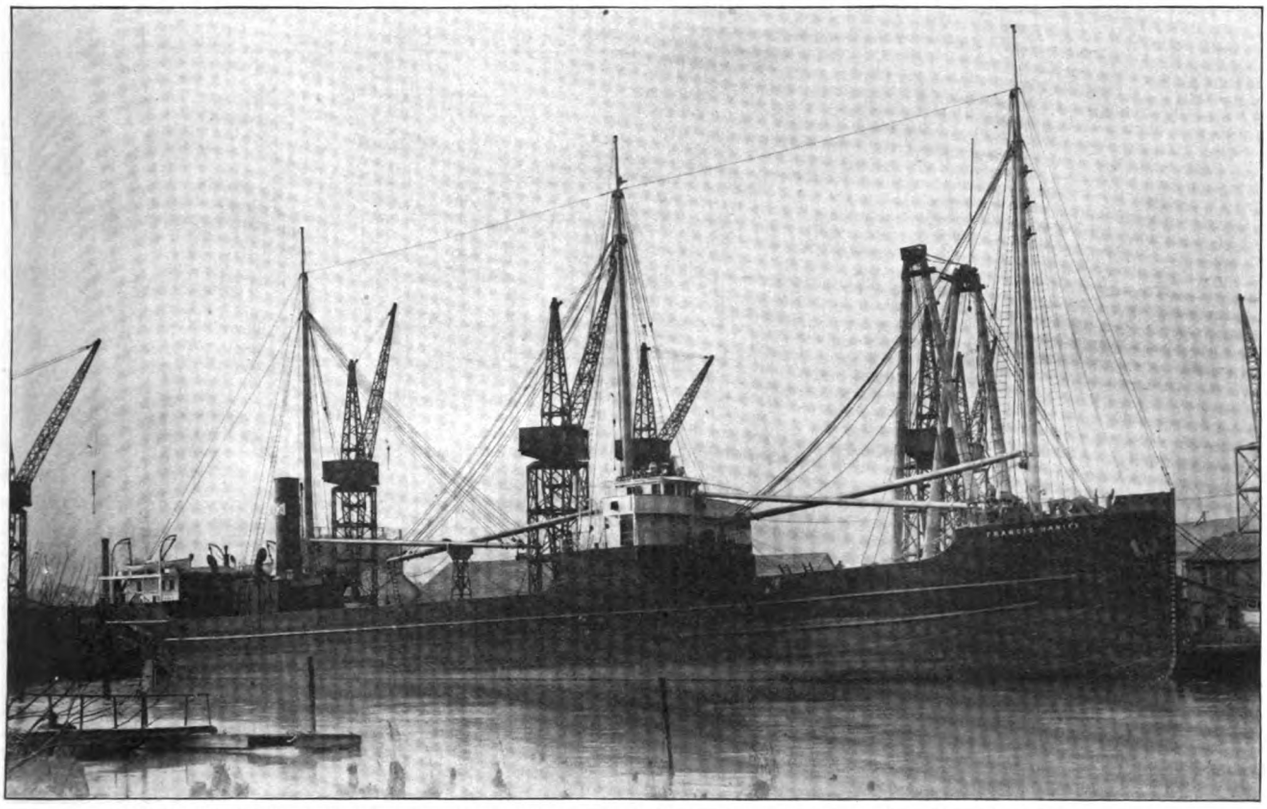
Steamer Francis Hanify

A Lumber Steamer Which the Harlan & Hollingsworth Corporation Has Just Completed for Pacific Coast Interests

THE steamer Francis Hanify, illustrated by accompanying drawings, is the seventh lumber steamer which the Harlan & Hollingsworth Corporation, of Wilmington, Del., have built for the Pacific coast trade. She differs from the others principally in the subdivision of her cargo hold. Vessels in this trade usually go northward from San Francisco for a cargo of lumber, and in light condition, which has proved to be unusually severe on them during the heavy nor'westers which they encounter. It has, therefore, been found advisable to subdivide them much like an oil tanker, so that one or more compartments may be filled with water or oil to increase their draught and correct their trim, as the machinery is placed aft.



LUMBER STEAMER FRANCIS HANIFY, BUILT BY THE HARLAN & HOLLINGSWORTH CORPORATION

The principal dimensions of the vessel are as follows:

	Feet.
Length over all	309
Length between perpendiculars	294
Beam, molded	45
Depth, molded	21

The hull is divided into the following compartments by transverse bulkheads: Fore peak, Nos. 1, 2, 3 and 4 holds, cofferdam, machinery space and after peak. The holds being further sub-divided by the longitudinal bulkhead and all riveted work being oil-tight spacing, the eight compartments are suitable for carrying a liquid cargo if required; each compartment is surmounted by a large cargo hatch having high coamings and oil-tight portable steel covers, heavily framed to carry deck load. A double bottom extends all fore and aft, 3 feet 6 inches deep. Oil fuel is carried in the double bottom and in fore peak tank; settling tanks for fuel are built in boiler room and extend to upper deck. Double bottom abaft cofferdam is used for carrying feed water and is increased in depth under engine seat.

Although not classed in any registration society, the hull is strongly constructed. The double bottom has three longitudinals on each side of centerline bulkhead, the framing being on the transverse principle with deep frames in lieu of webs, the frame and beam brackets being large and box beams are fitted at intervals. In line with outer coaming of hatches a box girder is worked above deck with intercostals between beams and a continuous member below beams, bracketed to bulkheads.

The shell plating at forward end has additional strength in shape of treble riveted seams and closer spaced frames to resist sheering and panting stresses when pitching in head seas.

The vessel has a closed forecastle, an open bridge and a closed poop. The doors in forecastle bulkhead and house around machinery are all water-tight.

As will be seen on the plans the deckhands are housed in the forecastle and have a stairway with companion on forecastle head for access when vessel is carrying a deck load. The deck officers' quarters are in a house on bridge deck, the pilot house and chart room being above same. The galley, store rooms, cook's, oilers' and firemen's quarters are located in the poop, the engineers' quarters and dining saloon are in the house on poop deck. The officers' and crew's

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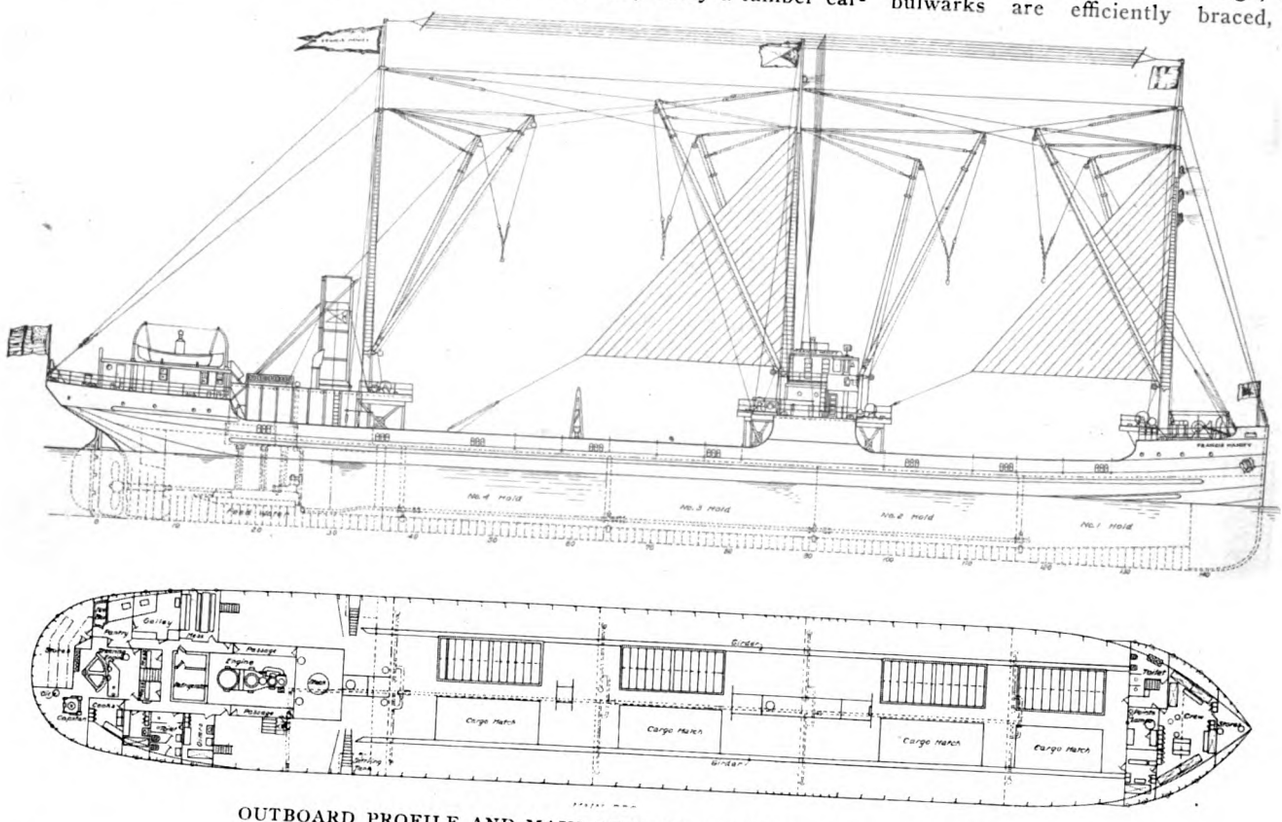
quarters are conveniently located and ample provision has been made for their comfort, showers being fitted in all toilets.

The vessel has three steel pole masts and carries sail on the fore and main masts. Each hold is served by two derricks 70 feet long, the vangs for the derricks being carried to the head of the mast opposite while one set of vangs has its standing and belaying parts on deck. This arrangement allows a clear space for swinging the lumber while loading or unloading.

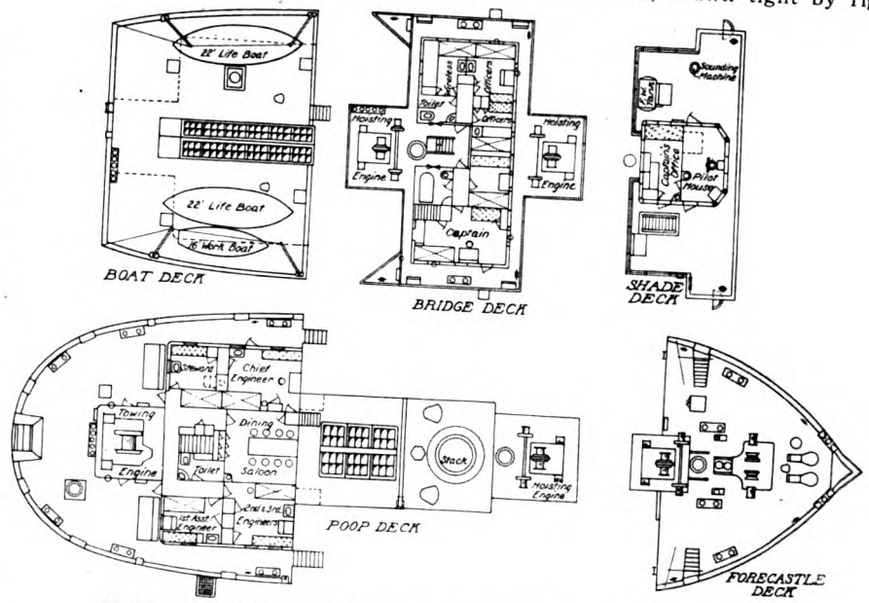
The winches, made by Murray Brothers, San Francisco, are of the double drum type to which the cargo falls are attached, the niggerheads being used for topping lifts, etc. The winches are operated by one man who stands with the winch at his back, and, being located on a high platform, he obtains a view of his lift during its transit from the vessel's hold to the dock or barge alongside, and is above the cargo even when vessel has a deck load on board.

A heavy towing machine, of American Engineering Co.'s make, is located in the deck house on poop, with an adjustable towing chock at rail aft; a warping capstan is placed on poop, and steering gear under the poop, the steam gear and the hand gear of which engage directly with the interchangeable tooth rack of quadrant, the windlass on forecastle head has large warping ends; these latter three auxiliaries are of the Hyde make.

The holds and hatches are arranged so that vessel may carry a lumber cargo, general cargo or a liquid cargo. An 8-inch main suction pipe, having 6-inch branches into each compartment, is provided, with suitable cargo pump in engine room. Provision is made for lumber deck loads as follows: The ends of forecastle, poop and sides of house around boiler casings are efficiently stiffened on outside, the bridge deck is 12 feet high having open ends, the winches are placed on platforms 13 feet high, the bulwarks are efficiently braced, a sampson post is built in after well to steady lumber and serves as rest for derricks, heavy chain lashings are fastened to chain plates secured to sheerstrake about 12 feet apart for length of open deck and meet over top of deck load, drawn tight by rig-



OUTBOARD PROFILE AND MAIN DECK OF STEAMER FRANCIS HANIFY



POOP AND BRIDGE DECKS OF STEAMER FRANCIS HANIFY

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ging screws and provided with chain slips so that in case of necessity they may readily let go. The vessel is lit by electricity and has a search-light fitted on top of pilot house, but controlled from within. She is equipped with wireless telegraph, life saving, and all other outfits required by the rules and regulations prescribed by the United States board of supervising inspectors.

The Francis Hanify can carry 3,500 tons of dead weight on a draught of 17 feet 6 inches and when carrying a deck load the dead weight may run well over 4,000 tons.

Photo shows the steamer John A. Hooper (built by the Harlan & Hollingsworth Corporation) when carrying a deck load, the total lumber on board being 2,100,000 square feet, taken at an average thickness of 1 inch. This vessel is 10 feet shorter than the new steamer, and has averaged 12 knots per hour in a loaded condition on a long sea voyage, the average fuel consumption being 7½ barrels of oil per hour. The Francis Hanify is expected to make 11½ knots under similar conditions with same machinery, as follows:

The machinery to consist of one triple expansion, surface condensing engine, having cylinders 21 inches x 34 inches x 56 inches diameter by 42-inch stroke, about 1,800 indicated horsepower at sea. The high and intermediate pressure cylinders have piston valves, and the low pressure cylinder has double ported slide valve, all worked by the Stephenson type link motion; the reversing is done by direct-acting steam cylinder, automatically operated. The condenser is cylindrical, separate from main engine. The condensing water is supplied by centrifugal pump worked by single-cylinder engine. The air and two bilge pumps are the ordinary single acting type worked from crosshead of the high pressure cylinder.

The shafting is forged from open-hearth steel, the crank shaft being 11½ inches diameter in three interchangeable sections; the thrust shaft has six rings working against a thrust bearing of the horseshoe type.

The propeller is cast steel, solid four-bladed, 14 feet 6 inches diameter.

There are two vertical duplex feed pumps 8 inches and 5 inches diameter by 18-inch stroke, which pump the water from the filter tank and discharge it through a feed water heater of the multicoil type to the boilers.

There are also independent pumps of the horizontal duplex type, one for fire system and bilges, one for wash deck system and bilges, one for salt water sanitary system and one for fresh water system.

There are two boilers of the cylindrical return tube type, each 14 feet 3 inches diameter and 11 feet 9 inches long, each having three furnaces; the working pressure is 180 pounds per square inch. The boilers are arranged for burning crude oil as fuel, the high pressure or mechanical system being used, the atomizing being done without air or steam.

The oil fuel system is very complete having a special pump for pumping the oil from the double bottom into settling tanks; from there it is pumped, through pumps, strainers and heaters arranged in duplicate, to the burners. Special valves operated from the deck are provided inside settling tanks for shutting off oil in case of leaks in the fire room, and the supply of oil to the burners can also be regulated from the deck.

Other auxiliary machinery in the engine room consists of one large cargo oil pump, one one-ton ice-making plant, two electric generating sets, one 12-ton evaporator, distiller, etc.

Jupiter's Electric Drive

The Application of This Mode of Propulsion Creates Spirited Discussion at the Meeting of the Society of Naval Architects and Marine Engineers

THE paper which created the greatest interest at the recent meeting of the Society of Naval Architects and Marine Engineers in New York, was Lieut. S. M. Robinson's paper on "The Applicability of Electrical Propulsion to Battleships with the Experience Gained with it on the Jupiter," abstracted as follows:

"The object of this paper is to show the best method of ship propulsion to be applied to battleships. It has been attempted to keep out all matters that do not bear directly on this one point. The Jupiter has been introduced merely to show the reliability of the apparatus that it is proposed to use. The navy department has authorized an electrical installation for the new battleship California and it is believed that she will mark the beginning of a new era in marine engineering.

"Briefly, the machinery for a battleship would consist of two turbo-generators running at a maximum speed of about 2,000 revolutions and generating current at about 3,000 volts, two switchboards, and four induction motors. The latter would be arranged with one on each of four shafts. The motors would be of the double squirrel cage type and the stators would be fitted with pole-changers which would give the motors two different numbers of poles and consequently two speed reductions. The motors would have two independent squirrel cage windings, the outer one having conductors of high resistance and the inner one conductors of low resistance. At high frequencies, such as would obtain in the rotor when starting up or backing, the inner winding takes practically no current due to its high resistance under these conditions; therefore the high resistance winding on the outside is the only one in operation and this insures a large torque for starting or backing. When running close to synchronous speed, the resistance of the inner winding is much reduced and it then operates like any ordinary squirrel-cage motor.

"In choosing a method of propulsion for battleships, there are six points to be considered. They are, in order of their importance:—

"1. Reliability.
"2. Maneuvering qualities.
"3. Economy.
"4. Space occupied.
"5. Weight.
"6. Care and upkeep.

"*Reliability.*—Taking these points in their order, the first to be considered would be reliability. The reliability of induction motors and large high speed turbo-generators for land use has been well known for some time, but up to about one and one-half years ago had not been demonstrated on board ship. However, experience at sea with them has not developed any trouble, and their reliability is now unquestioned. There are several things that go to make an electric installation more reliable than any other. First, the installation is in duplicate throughout and the breaking down of one engine does not affect the ship except at high speed; it might be said that this is true of other installations, but it is not

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true in the same sense nor in the same degree that it is with the electric drive. For example, if one turbo-generator breaks down, the ship can still run in a perfectly normal manner up to a speed of about 19 knots. This would be impossible with any other mode of propulsion; even at speeds within the power of one engine on a twin screw ship the maneuvering qualities would become so bad as to handicap the ship; in fact a twin screw ship operating with one engine, would be able to reach port safely but would be of very little use in battle, whereas an electrically-driven ship, operating with one turbine would be just as good as any ship up to a speed of about 19 knots.

Question of Auxiliaries

"Then, too, there is the question of auxiliaries; with other forms of propulsion, if the auxiliaries in one engine-room break down, that engine-room may be almost entirely put out of commission. Of course the main air and circulating pumps are cross-connected, but when operating that way they are not very satisfactory and I have seen a battleship forced to stop because the forced lubrication pumps in the starboard engine-room broke down. If the ship had gone ahead with the port turbines, the starboard turbines would have revolved and burned out the bearings, so that it was necessary to stop the ship and repair pumps; with electric drive it would be a simple matter to shift to the other engine-room and make repairs without stopping.

"There is one thing that makes the installation more reliable than other forms of turbine drive, and that is the fact that the turbine revolves in the same direction all the time. The importance of this can not be overestimated, as it is believed by operating engineers that the greater amount of blading trouble that ships have had is nearly always due to the distortion that occurs when backing. There is also one other advantage when compared with reciprocating engines, and that is that the turbines would be less susceptible to damage by water when the boilers are priming. This fact has been thoroughly demonstrated by experience on the Jupiter.

"*Maneuvering.*—As regards maneuvering qualities, it is believed that the electric drive is far superior to any other method. This point will be taken up more in detail when the Jupiter's installation is discussed. It is rather difficult to describe these advantages on paper, but very easy to appreciate when you see the machinery working. Instead of big heavy throttles to open and close, there are light, easily handled oil switches, and a speed controller that can be handled with one finger. The engine-room watch required for a battleship would be just half what it would be with other means of propulsion, as one engine-room would be idle practically all the time. In a rough sea there is no racing, with its attendant strains on machinery and on the personnel on watch. Any desired speed can be very quickly attained. The speed can be very accurately maintained and without any effort on the part of the personnel. These last two points are of very great importance on battleships when maneuvering in formation. The stand-by qualities are also superior to those of other installations for at a very small expense in the way of steam, the main turbine can be kept running very slowly and the engine-room is then ready to answer signals at any time; this might be of great importance to a battleship. The backing qualities of this installation are also superior to other forms, particularly turbine installations. It is possible to attain full power in the astern direction.

"*Economy.*—In considering the question of economy, we have reached the point which first suggested the use of electricity for the purpose of propulsion. None of the older forms of propulsion such as reciprocating engines or direct connected turbines, can compare at all favorably with this method, the gain in economy being over 20 per cent at high and cruising speeds. The only other method of propulsion that would appear to compete with this method in economy would seem to be the combination of high-speed turbines, and reduction gears. The loss in the latter amount to about 2 per cent, while in the electric reduction gear the losses are from 8 to 9 per cent. Mechanical reduction gears have been developed to a high degree, and it is very probable that in quite a number of cases the mechanical gears would be preferable to the electric drive, but as this paper is limited to a discussion of battleships that subject will not be touched.

Economy of Two Methods

"For battleships I do not believe there is any question of the relative economy of the two methods—the electric drive is far superior. The electric reduction method possesses two inherent advantages that the mechanical method can not overcome. First, the electric installation uses only one turbine at low powers; second, the induction motors are fitted with pole changers which allow the turbine to be run at normal speed with the ship cruising at low speed—in other words, the electric drive permits of two speed reductions while the mechanical gear has only one. These two advantages exist no matter how the two installations may be laid out, and they far outweigh the difference in the losses of the two methods. To show just how great these advantages are, two curves are shown The load curve does not really show how very bad the conditions are for a battleship, as in that case the power at 12 knots is only about one-seventh what it is at 21 knots and the curve shown does not give so great a per cent of reduction. The speed curve is very steep at the low speeds and shows the bad effect of reducing turbine speed very greatly. As nearly all the cruising of a battleship is done at fairly low speeds, it is evident that the electric drive will be more economical than the mechanical gear.

Losses Due to Friction

"In addition to the two advantages just stated, there are a number of other things entering into a comparison of the two methods that make it very doubtful if the mechanical gear would be as good, even at the high speeds, as the electric reduction. It would probably be necessary to use at least four turbines with a mechanical gear instead of two as with the electric method; this fact alone would make the electric reduction the more efficient of the two. Then there are also the very considerable losses due to the friction and windage of the backing turbine. According to Sir Charles Parsons this loss amounts to about one-half a per cent. Also there would be a saving due to the fact that only one set of auxiliaries would be used at a time.

"*Space Occupied.*—As regards the actual space that the machinery would occupy, the electric drive would take up less space than any other installation, with the possible exception of the mechanical gear. The arrangement of the machinery, however, is so much more flexible with the electric drive than with other methods that it is probable it would occupy less space than would the gears. It lends itself very readily to watertight subdivision.

"*Weight.*—The next point to be considered is that of weight and here again the electric drive is superior to any other method with the possible exception of mechanical gears. It is rather difficult to say exactly how the two methods would compare either as regards space or weight as a great deal would depend on the number of turbines used with the mechanical gear in order to get 30,000 shaft horsepower. However, if the largest sizes of geared turbines now at sea are any guide, the weight of the electric drive would be

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less than the weight of the geared turbine.

"Care and Upkeep.—As regards care and upkeep, the electric drive is greatly superior to either reciprocating engines or direct-connected turbines, also due to the fact that the turbines do not have to reverse, it would be superior to the geared drive in that it would have less blading trouble. Either of the two latter methods, however, is very satisfactory in this respect, as a high-speed turbine is so small that it is easily handled and repaired by the ship's mechanics.

The Jupiter's Installation

"This completes the case of the electric drive for battleships; all of the points have been considered and in every case it has been seen that it has no superior. There are, however, some points that have been made against electric propulsion and these will be taken up before proceeding to a discussion of the Jupiter's installation. First, there is the danger from large quantities of water in the engine-room; however, this danger is more fancied than real, as all the wiring could be placed well overhead, being taken out of the tops of the motors and generators. The generators could be placed high enough to insure their safety and the motors could be placed in watertight pits so that the engine-room could have enough water in it to put the auxiliaries out of commission before reaching the main engines. The next point is that, when operating with one turbine, all motors must run at the same speed if they run at all; this fact has been found to be no handicap in actual operation. The next point is that, in turning, the inboard screw does not slow down; this slightly increases the turning circle, but does not increase the space necessary to turn in, as the inboard screw can always be stopped or backed.

"The equipment on the Jupiter is similar to that which would be used on a battleship so it offers a good example in many points that have been advanced in favor of the electric drive.

"The Jupiter has been in commission over a year and a half. During that time she has conducted two official trials and has carried on the usual routine work of a navy collier. She has steamed about 14,000 miles and has been handled a great deal around docks, in narrow channels, and other places where a great deal of engine handling was required. About one-half of the steaming has been done in the tropics with circulation water over 80 degrees Fahrenheit and with correspondingly poor vacuum, so that the economy of the ship is known under all conditions. The fuel economy has proved to be excellent, being, on the average, about 25 per cent better than the best of her sister colliers.

"During the whole period of commission, two repairs have been made to the main engine. The first was to reblade the first stage of the turbine. This work was done entirely by the ship's mechanics. The first stage blading was injured by a bolthead from the segment carrying the fixed blading. The bolt was broken off, probably through having been set up too hard while assembling. These bolts were all tap bolts and have ben replaced by filister head screws with countersunk heads and a repetition of the accident would not be possible. The accident, however, was in no way peculiar to the electric drive as it might very well have happened to any other engine. The other repair was to replace one of the porcelain cylinders which carry the resistance; this cylinder was cracked when the ship went into dry-dock, but it was never discovered whether the cracking was due to the oiler putting undue pressure on the cylinder or due to some strain brought on it when the ship settled on the keel blocks. At any rate the damage was repaired by two machinists in about two hours.

"The amount of work expended in keeping the equipment in condition has been very small. After coming in from a run, the turbine clearances are taken to see if they have changed; and the motor clearances are also checked; there has been no change in either of these clearances up to date. Before getting under way the holding-down bolts of the turbine are gone over to see if they are tight, the slip rings on the motor of the generator are examined to see if they are clean and all insulators are also examined for cleanliness, all connections are generally gone over to make sure they are tight, the oil switch boxes are examined to see if they have the proper amount of oil and the governor control-valve springs are tested to see if they have the proper tension. After starting the turbine, the emergency trip is tested. In port the oil pump is run once a week to force oil through the turbine bearings and the motor shafts are jacked daily. Due to the fact that the main condenser is used a great deal (the auxiliary condenser being too small to handle the coaling winches), the small pump for draining the turbine casing is run for a few minutes each day when in port to make sure that no water may be allowed to accumulate in the turbine.

"In operation the Jupiter's engines have been highly satisfactory. There has been only one time when anything has happened during the handling of the engines and that was the tripping out of an exciter. The lighting set was immediately put on for exciting and the engines were ready to use again in about one and one-half minutes. If such an accident were to happen again it would take even less time as the men are more familiar with the installation. At the time the accident occurred the ship had just left the navy yard for the first time.

Handiness of Engines

"The handiness of the engines has been proved more than once; the ship has been handled a great deal in narrow waters and around docks. She steers very badly at times and the quick response of the engines has more than once helped in getting out of difficulties. The engines have been used to swing ship for compass deviation without putting any way on the ship at all, the total space used for swinging being little more than the ship's length.

"The ability of the turbine to stand severe abuse from water has been demonstrated several times. There is no separator on the main steam line, and several times the boilers have primed and carried considerable water over into the turbine. This was particularly noticeable during docks trials when it was impossible to properly handle the boilers. The only indication the turbine gave was an increase in the first stage pressure and a rattle in the casing as the water was hurled through at a high rate of speed, but the turbine blading showed no signs of bad effects from this.

"The backing qualities of the engines have proved to be all that could be desired; if the ship is cruising with the resistance in, the time taken for reversing is practically nothing at all; if the resistances are out, it takes a few seconds—not more than three.

"When underway the engine-room is very cool, due to the fact that the generator is fitted with air impellers at each end which take their suction from the engine-room, thus insuring good circulation of air.

"After all, the greatest test of the satisfactory working of any machinery is whether the men who are actually handling it and caring for it are pleased with it. If this test applies to the Jupiter's machinery it certainly is an unqualified success. In particular is this true if the matter is referred to the coal passers in the fire-room who have to handle much less coal than do the men on sister ships. The ship can make her contract speed of 14 knots without using forced draught at all."

Mr. W. L. Emmet's discussion of this paper will be published in the April MARINE REVIEW.

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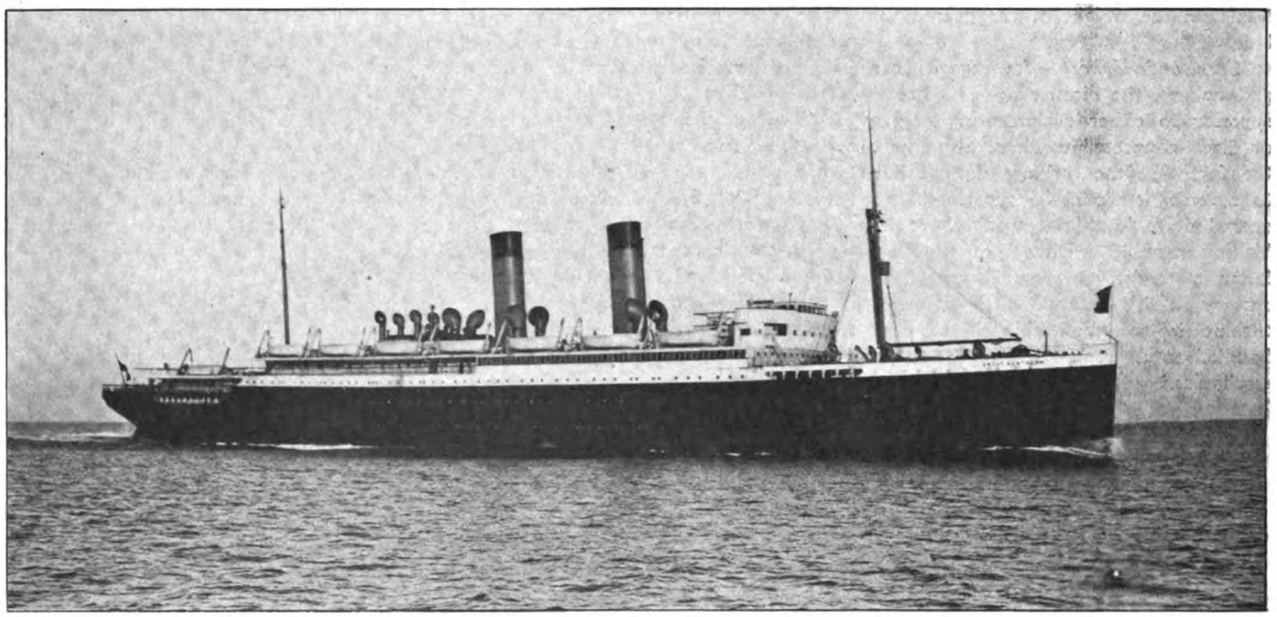


THE NEW PACIFIC LINER GREAT NORTHERN

Two Splendid Steamships

Description of the Great Northern and Northern Pacific Which Cramps Have Built for the Spokane, Portland & Seattle Railway Co.

THESE two exceptionally fine vessels have been built by the Wm. Cramp & Sons Ship & Engine Building Co., to the order of the Spokane, Portland & Seattle Railway Co., and are to run between Astoria at the mouth of the Columbia river and San Francisco. It is intended to maintain a schedule of 24 hours between the ports named; consequently, the vessels are of very fine lines and capable with the machinery installed of developing a maximum speed of 34 knots an hour.

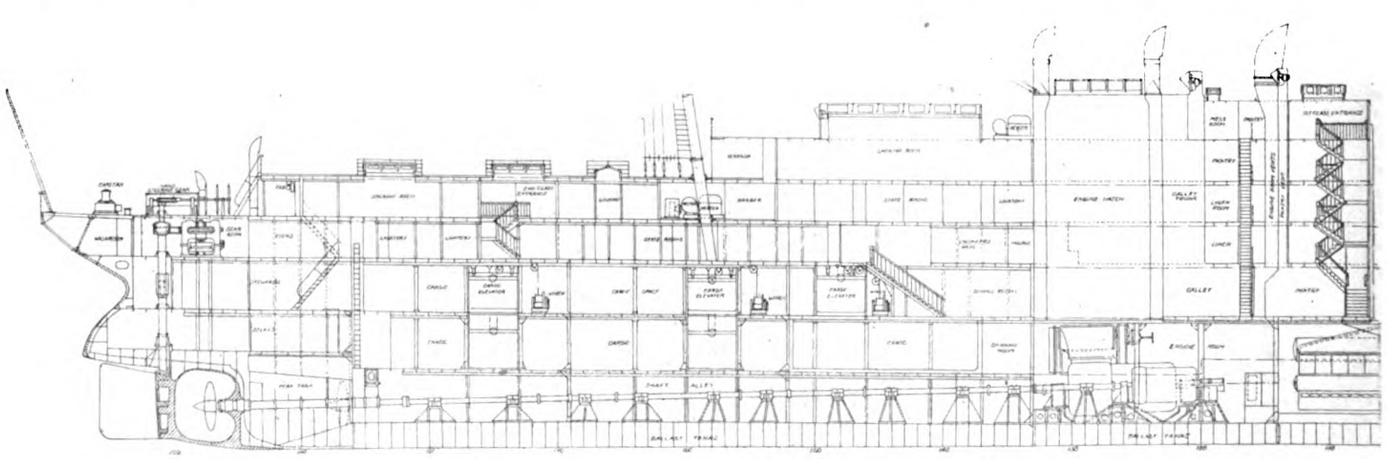
The vessels have had special attention paid to the safety of the passengers, both from the danger of fire and from collision at sea. The vessels are divided into numerous watertight compartments, by such an arrangement of transverse bulkheads and longitudinal bulkheads that the three forward compartments can be bilged and filled with water, without altering the trim of the vessel to such an extent as to bring her below the margin of safety line. Any other two compartments in the ship can be similarly bilged without endangering the safety of the vessel.

The vessels are fitted with Parsons turbines driving three screws; one center and two wing screws. The boilers are Babcock & Wilcox water tube express type, having a total heating surface of 60,000 square feet with a working pressure of 220 pounds per square inch. In all there are 12 of these boilers in two water-tight compartments. They are fitted for burning oil under forced draft system consisting of turbine-driven blowers, three in each fire room.

The general dimensions are, as follows:

Length, p. p.	500 ft. 0 in.
Length, overall	525 ft. 0 in.
Beam, molded	63 ft. 0 in.
Depth to "A" deck	50 ft. 6 in.

The vessels have straight stems slightly raking forward and elliptical sterns; the stern at the waterline being extended aft so as to provide for greater length of load line. The appearance of the vessel is extremely



INBOARD PROFILE OF THE STEAMSHIP GREAT NORTHERN

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pleasing and graceful due to the fineness of the lines and the character of the stem and stern adopted.

The vessels are constructed of steel to rate 100-A in the British Lloyds. A double bottom constructed on the cellular system extends from the forward peak bulkhead as far aft as the fineness of the vessel will permit of cellular construction to be carried out. This double bottom is subdivided by enormous watertight floors which render it suitable for carrying oil fuel and water ballast as occasion may require.

The vessels are fitted with two pole masts. On the foremasts are fitted derricks capable of handling five tons each. On each side of the vessel five cargo ports are fitted for handling cargo. The cargo in a vessel of this character must necessarily be more or less express in character and very heavy weights are not provided for. An exceptionally large number of ports are provided for the rapid handling of the cargo. Special attention has been given to providing for the transportation of automobiles. A special port forward having been constructed so that the largest limousines can be accommodated. Arrangements have also been made to carry perishable freight by providing storage in refrigerated compartments of about 20,000 cubic feet capacity.

General Arrangement

The general arrangement of cabin is such as to provide for the accommodation of 478 first-class passengers in two-berth rooms; 106 second-class passengers and about 200 third-class passengers.

The greatest of care and attention has been given to providing for the comfort and pleasure of the patrons of this line, and to this end numerous public and private bath rooms have been installed so that passengers coming on board after their trip across the continent will have opportunity to enjoy sea baths during the trip between the ports.

On the upper deck forward a curved steel bulkhead or shield has been provided, which absolutely divides the first-class quarters from those occupied by the crew and third-class passengers, forward of this shield. While accomplishing this purpose this shield also serves to protect the cabin passengers from wind and spray which would at times accompany the passage of such a fine vessel through the seat at so great speed.

Abaft this shield has been provided a sun-parlor for a distance of over 100 feet, where the sides of the vessel are enclosed with steel work and fitted with sliding glass windows. This space protects the passengers at all times from wind and weather and offers a delightful space which may be used as an observation room or for dancing. These enclosed spaces are on either side of the forward deck house, which is of steel and is fitted within with commodious sofas, chairs, etc., for the accommodation of passengers. The sliding glass windows fitted at the side enable passengers to enjoy the fresh air without the discomforts of spray and extremes of temperature, which are common to the exposed deck.

Immediately abaft the observation room is fitted up the main entrance and stairway, which extends from the various decks to the dining room, which is located three decks below.

The observation room is fitted up in the delightful style of American-Colonial architecture and the stairways are also treated in the same way, having mahogany rails and white balusters; the whole having a most pleasing effect.

Large dome skylights afford light and ventilation to the observation room and to the lobby in proximity to the stairways.

At available spaces in the machinery casings beautiful oil paintings of western scenes will be mounted, making the lobbies a delightful place for the patrons of the line to congregate.

Throughout the steel deck house, within the limits of the sun parlor or enclosed deck, French windows will be fitted in the deck house, giving a splendid view and ventilation.

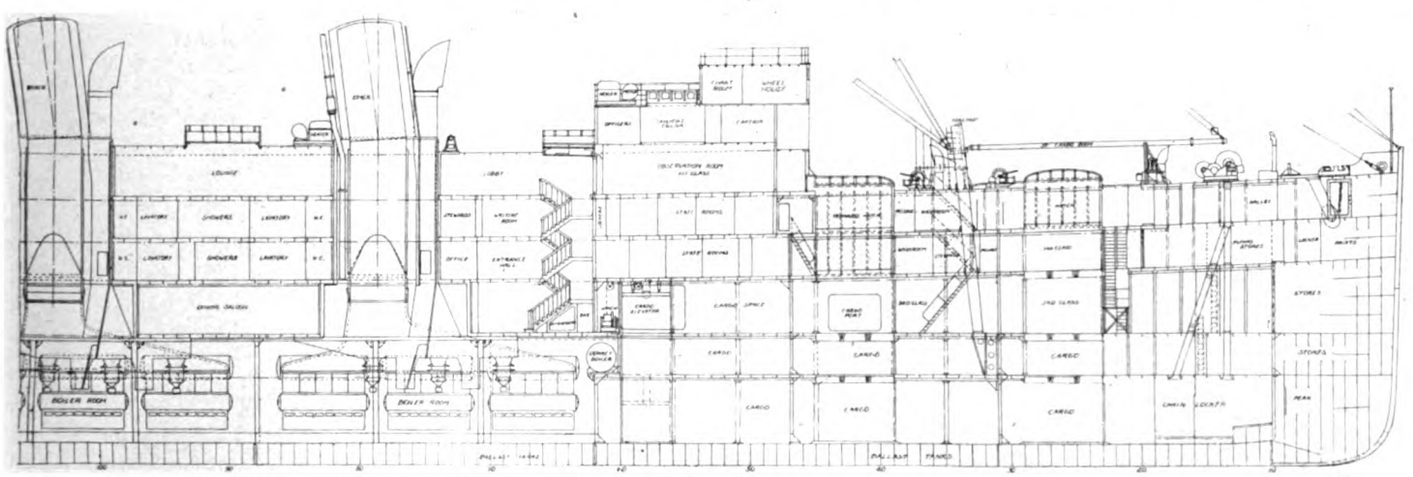
The Passenger Quarters

Abaft the main lobby is fitted the ladies' lounge in which the colonial style of architecture is maintained; the treatment being in somewhat different phase than that of the observation room. The lounge is also within the limits of the sun parlor and is fitted with French windows referred to above. A fireplace at one end is provided so that the appearance of the room with its decorations and multitude of easy chairs and comfortable sofas, etc., is one of great beauty and luxury.

Abaft the lounge and beyond the limits of the sun parlor a number of rooms are fitted, known as bachelor's rooms. These rooms accommodate two persons each and have shower baths and toilet facilities in connection with each stateroom.

At the after end of the deck house is located the smoking room, which is finished in oak, treated in the Elizabethan style of architecture. This room is of exceptionally pleasing character being fitted with fireplace at one end with exceptionally large skylight immediately over the room, giving the appearance of spaciousness and fine ventilation. A room is provided adjacent to the smoking room for the serving of refreshments. Numerous tables, chairs, lounges and settees are provided for the comfort of those who prefer this part of the vessel.

Just at the end of the smoking room a veranda is fitted with the after end open to the weather. This is especially for the comfort of those who are troubled with sea-sickness, and great attention has been paid to providing for



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the comfort of this class of travelers.

Throughout this deck the public spaces are brilliantly lighted by electricity. The fixtures being in keeping with the corresponding style of architecture used in the treatment of the room.

Life Boat Capacity

Immediately abaft the deckhouse as well as on top of the deck house are located the life boats which are handled by davits positively operated and controlled by mechanism. Ample life-boat capacity has been provided so that there is provision for every passenger and for each member of the crew.

On the two decks below the deck just described are located the sleeping cabins, public and private baths, both for the first and second class. Every comfort known to the art of shipbuilding has been provided for the passengers.

On the second deck a number of suites have been provided with parlors and bath rooms attached, and are so arranged that a number of rooms can be thrown together to provide accommodations for parties of a number of people when so desired. These rooms are fitted up more handsomely than the regular staterooms, and are treated in the colonial type of architecture, which prevails in almost all the public spaces of the vessel.

The dining room is located amidships and is treated in the Adam style of architecture. The arrangement of this room is exceptionally pleasing, seating accommodations being provided for about 270 people. The dining room throughout is ventilated by fresh air forced into the room and exhausted through the galley and pantries. The lighting of the room is to be semi-direct and fixtures of great beauty in keeping with the character of decoration of the room are provided.

Entrance to the dining room is obtained by a continuation of the grand stairway which opens into the lobby, where illuminated scenes along the routes of the railway are furnished making the lobby one of attractive appearance. As the passengers come from the upper decks to the dining room lobby and reach the lower stair, they come to a most magnificent view of Glacier Park or Yellowstone Park, which greets the eye with a most pleasing and novel effect.

Abaft the dining room are located the large pantries, galleys, refrigerating rooms for the storage of food, bakeries, sculleries, fitted with all the implements known to modern culinary science.

The second-class dining room is located immediately abaft the galley so that the first-class dining room and the second-class dining room are served from the same galley, one being forward and one being aft. Each dining room has its separate pantry. The second-class dining room is finished in oak, and is lighted by electricity and ventilated and supplied by fresh air by mechanical means.

The sleeping cabins have been fitted out with sanitary conditions in view. To this end the berth fronts and leaboards are all metal finished in white enamel and silver. Washstands and receptors are of vitreous porcelain and are all open so that there is no chance of bad odors arising from hidden fittings. A new type of lavatory has been especially designed to meet these conditions. The rooms are provided with sofas and racks and other convenience for the comfort of the occupant.

In furtherance of the sanitary idea the decks below the upper or weather deck are covered with a composition known as Litosilo, which is made in accordance with a proprietary formula, and which gives great satisfaction both in wear and ease under foot, and does not absorb moisture to such an extent as wood deck planking. This composition is manufactured by the American Litosilo Co. of Philadelphia.

In the passages and public spaces this flooring is covered with the well-known "Dreadnought" floor covering, which adds to the safety and ease in traversing these passages.

The turbines are of the Parsons type of latest design placed in a common engine room together with the auxiliaries whose functions are necessary for the operation of the main engines. There are three shafts, the center shaft being driven by the main high pressure turbine, each wing shaft is driven by the main low pressure turbine, containing an astern turbine in the exhaust casing.

The heating and ventilating of the vessel is on the "Thermotank" system, where at pleasure heated air is forced to the living space and fresh air can at all times be supplied in this way.

Progress in Naval Architecture

The vessels will be the latest word in the progress of naval architecture and marine engineering in America. Owing to the exceptionally high speed and large power the performance of these vessels are looked forward to with great interest both by the general public and the engineering world.

The first of the vessels the "Great Northern" was successfully launched on Oct. 7, in the presence of officials of the road. The christening was performed by Mrs. C. C. Lacey, wife of the marine superintendent of the line. The launch was most successful. The time occupied from the releasing of the vessel at the bow to that of being entirely in the water was one minute. A maximum velocity of 25 feet per second was obtained.

Isherwood System of Ship Construction

The Isherwood system of ship construction during the year 1914 has again made marked progress. The total number of ships now built and being built is 315 with an aggregate gross tonnage of about 1,480,983.

The total number of vessels launched during the current year is 45, representing about 274,990 gross register tons.

That this system can be applied with advantage to all classes of vessels is evidenced by the following analysis of the boats already built and now on the ways:

Cargo vessels	129, representing about	574,337	gross tons
Oil tank vessels	125, representing about	666,180	gross tons
Colliers	20, representing about	119,288	gross tons
Passenger vessels	9, representing about	27,769	gross tons
Great Lake freighters	13, representing about	83,873	gross tons
Barges	16, representing about	8,206	gross tons
Dredgers	2, representing about	760	gross tons
Trawlers	1, representing about	570	gross tons
	315	1,480,983	

The most notable vessels built during the year include five more huge oil tankers of the 15,000 tons dead weight type, three more large freighters for the American lake trade, and special interest also attaches to the W. Grant Morden, built on the Canadian lakes, as this vessel is probably the largest bulk freighter at present afloat throughout the world. With the addition of this vessel, the Isherwood fleet has now the distinction of including the largest oil tank vessel and cargo vessel afloat.

Vessels have been constructed to the highest classification of Lloyds Register, British Corporation, Bureau Veritas, Germanischer Lloyd, Norse Veritas and American Bureau, and the system has for certain classes of vessels been adopted by the governments of Great Britain, United States of America, Italy, Russia and France.

Buffalo Lodge, Ship Masters' Association, elected the following officers at its last meeting: John A. Montgomery, president; Iver Rolseng, first vice president; Thomas Stevenson, second vice president; E. L. Shaw, secretary; John B. Ball, treasurer; Frank Gebhard, chaplain; Daniel Coughlin, marshal; James Burns, warden; Jeremiah Buckley, sentinel.

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Producer Gas Powered Boats

This Form of Power is Rapidly Developing in the United States — Considerably Cheaper Than Coal or Gasoline

GAS producers are related to internal combustion engines, such as gas, gasoline and oil engines, in the same manner that steam boilers are related to steam engines. The steam boiler, by using fuel, usually solid fuel such as coal, makes

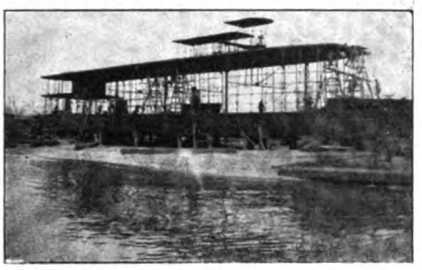

FIG. 1—PRODUCER GAS BARGE CHATHAM ON THE STOCKS

steam which is turned into power by the steam engine. The gas producer, by using solid fuel, makes gas which is then turned into power by the gas or gasoline engine.

The reason for using the producer and gas engine instead of the steam engine power plant, is that it is much more economical, weighs less, takes up less room, and requires less work and attention. For instance the average marine 100-horsepower steam plant will average to use from four to eight pounds of coal per horsepower hour, whereas a gas producer plant will use but one pound of coal per horsepower hour. In other words, if a steam 100-horsepower plant runs 10 hours full power, it will average to use about 6,000 pounds of coal, whereas the producer plant, giving exactly the same amount of power, uses but 1,000 pounds of coal to give the same amount of power. This means but about one-sixth as much coal to buy and provide room for on the boat, to say nothing of the saving in weight and labor.

The producer is added to the gas or gasoline engine because it saves fuel cost, insurance cost, and danger. Eight pounds of coal does the work of a gallon of gasoline. Producer gas coal at $5.00 per ton is as cheap as gasoline at 2 cents per gallon. Producer gas coal even if it costs $10.00 a ton is as cheap as gasoline or other oil at 4 cents per gallon.

In addition to its remarkable economy, the marine gas producer weighs but from one-fourth to one-third as much as a Scotch marine boiler and takes up only about one-third as much space as a watertube boiler. It also requires less help, as the coal is charged into the producer in large quantities in comparatively cool quarters at intervals of about four hours, whereas with a steam plant it is necessary to have stokers in constant attendance.

Money invested in gas producers, used, say ten hours per day, averages to earn about 100 per cent per year as compared with steam and 200 per cent per year as compared with gasoline, etc., used for power purposes.

The users of some of the boats shown here, say that the cost of insurance on their boats is but one-half as much as it was when they used gasoline instead of producer gas.

Producer gas power is being adopted at a very rapid rate. The United States government has, during the last few years, carefully investigated over 1,000 plants in use in this country, as well as foreign plants. The government has made accurate tests with many kinds of fuel in the producer plants owned by the government, and has printed several pamphlets on the subject, which speak in the highest terms of this new means of developing power, with a surprisingly small fuel consumption, a total absence of smoke when in operation and an engine exhaust clear, colorless and odorless.

People who have only seen the crude and entirely experimental producers that were built a few years ago, and who are only familiar with the erratic operation of this mechanical baby, when it was first "learning to walk" or "to go alone" are surprised to see how quickly it has developed and taken its place in the world. The steam power man can no longer truthfully call the up-to-date gas power plant unreliable. Insurance reports for Great Britain giving averages for an entire year, show that there was an average of one break

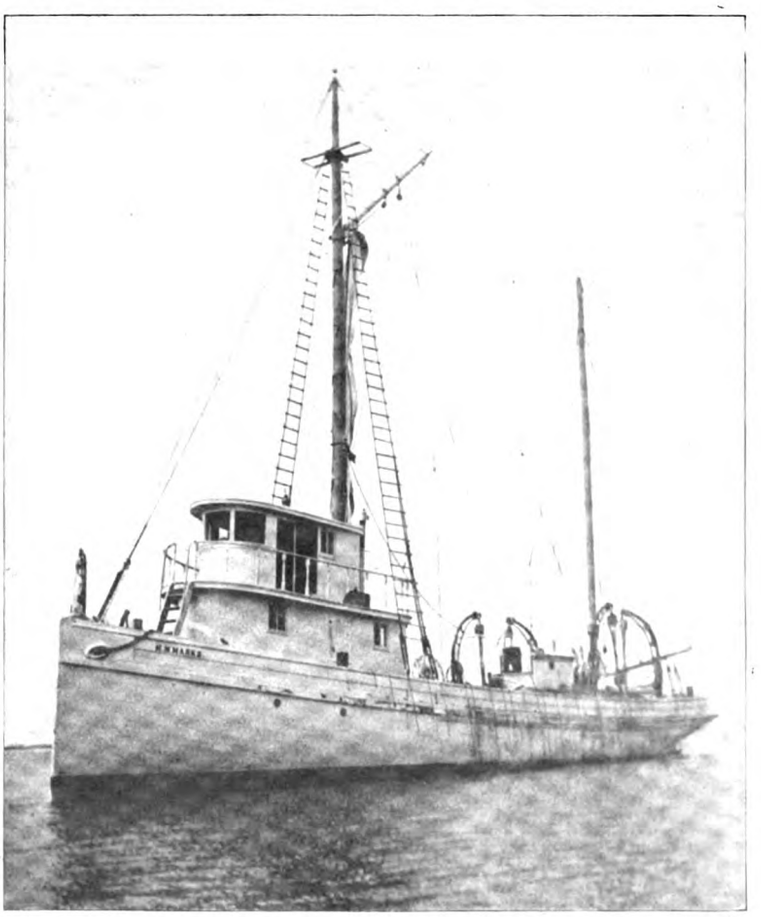

FIG. 2—FISHING VESSEL H. N. MARKS EQUIPPED WITH PRODUCER GAS ENGINE

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down in every eight among steam plants, whereas there was but an average of one break down in twelve in gas power plants. These averages of hundreds and hundreds of plants show the gas plant not only as reliable as the steam plant, but more reliable than steam plants of the same size.

The freight boat Richmond, which made her trial trip the latter part of 1913, is a fireproof steel barge, 150 feet long x 30 feet beam, having a mean draft, when running light, of but 24 inches. Her hull is divided into five or more water tight compartments. Solid freight is all carried above the deck. There are two freight compartments each 54 feet long x 26 feet wide. The clear head room in the freight space is 15 feet.

Propulsion is by two Wolverine gas engines of 75 horsepower each. Each engine drives a propeller wheel in a tunnel in the stern. Distance between the two engines and between the two tunnels is about 12 feet. Gas is supplied to the two engines by one 150-horsepower marine gas producer built by A. L. Galusha & Co., 311 Atlantic avenue, Boston, Mass. About 150 pounds of coal is the total amount of fuel used per hour by the gas producer to make gas for the two engines. This means a fuel consumption of from 8 to 10 tons per week to operate the power plant 24 hours a day for four and one-half days per week and intermittently the rest of the week.

The remarkable compactness of the power plant is indicated by the overall dimensions from the rear of the aft freight room to the after side of the gas producer. In this space of but 16 feet fore and aft, is the engine room and the gas producer. In the engine room there is placed, in addition to the engines, bilge pumps, air compressor, storage batteries, for electric lights and high powered search light, a 10-kilowatt electrical generator, and a very powerful fire pump capable of delivering two streams for 1-inch nozzles.

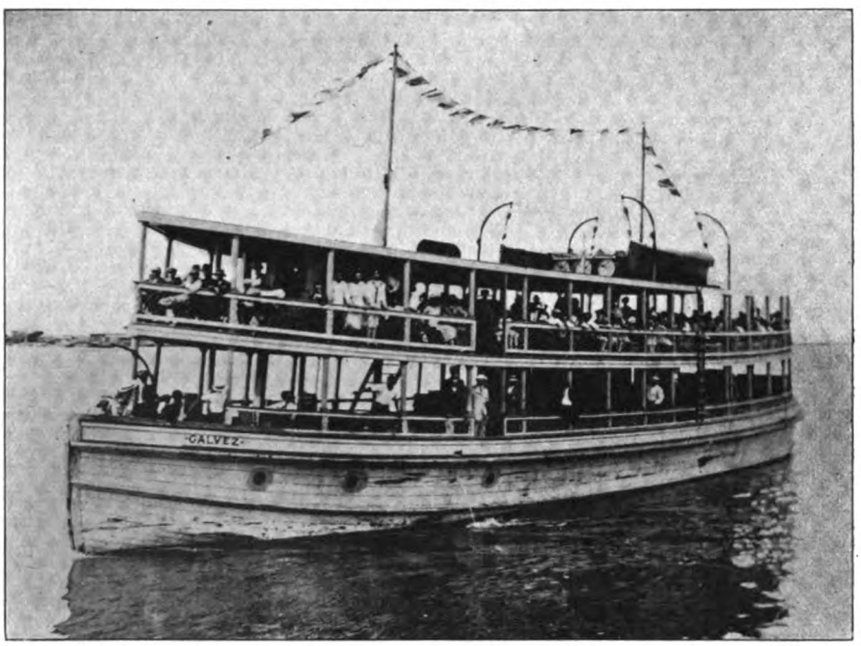

FIG. 3—PASSENGER BOAT GALVEZ FITTED WITH GALUSHA MARINE GAS PRODUCER

Steam plants on boats of even less size and of the stern wheel type, take up more than twice as much space, fore and aft, and leave but half as much enclosed freight space. The steam plants also require several times as much fuel for which additional weight and bunker space provision must be made.

The Richmond has a speed of between four and five miles per hour against the current and of nine or ten miles with the current. The owners are much pleased with results. At the present time they are having a sister barge, the Chatham built, in which a producer gas power plant, exactly like that in the Richmond will be installed. The accompanying picture (Fig. 1), shows the Chatham as she appeared several weeks ago while being erected at Savannah, Ga.

Handling through freight on the 250 to 300 mile run between Augusta and Savannah, Ga., is the exclusive use of these two barges.

Richard Clark Wilson, of New Orleans, is the designer. The Racine-Truscott Shell Lake Boat Co., of Muskegon, Mich., are the builders.

Laurie L. Wever, of Savannah, Ga., is the chief operating engineer.

Fig. 2 shows the fish boat M. M. Marks, which has been in operation for two years, equipped with a 75-horsepower gas producer and engine. The speed of the boat, heavily laden with fish and in stormy weather is between nine and ten miles an hour. The owners state that in a 300-mile run along the coast of the Carolinas, from Southport to the neighborhood of Cape Hatteras, this boat has a fuel consumption of but about one ton of coal, whereas the sister boat Pilgrim equipped with but a 70-horsepower gasoline power plant uses $64 worth of gasoline to make the same trip at the same time as the Marks.

Fig. 3 is the passenger excursion boat Galvez, 101 feet long, in use during the past two seasons at Galveston, Tex. She carries 318 passengers and a 100-horsepower motor and Galusha gas producer drives her. This 100-horsepower plant uses about one-half of a ton of coal per 10-hour full power run. If coal costs as high as $8.25 per ton, the cost to run a 100-horsepower producer plant full power for 10 hours is only $4.13. The lowest price at which gasoline is ever sold at Galveston is reported to be 9 cents a gallon. It would take 125 gallons of gasoline to give 100-horsepower for 10 hours of this work, at a cost of $11.25. So the producer in the Galvez under most unfavorable conditions

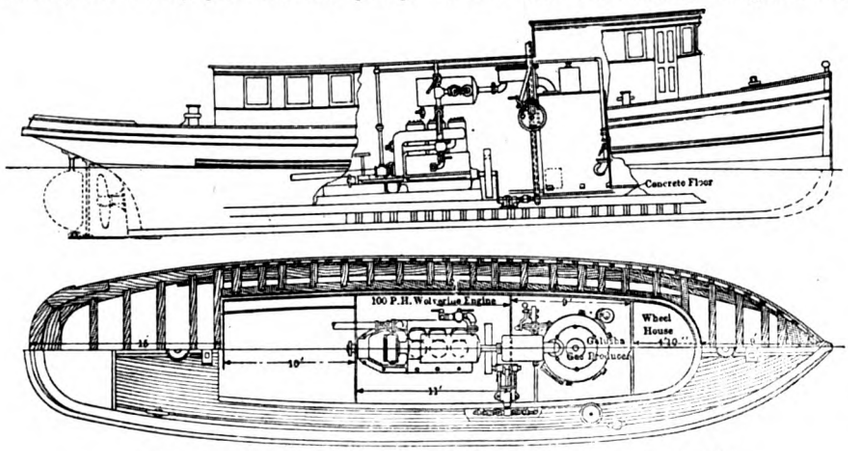

FIG. 5—GENERAL ARRANGEMENT OF TOWBOAT WEBB

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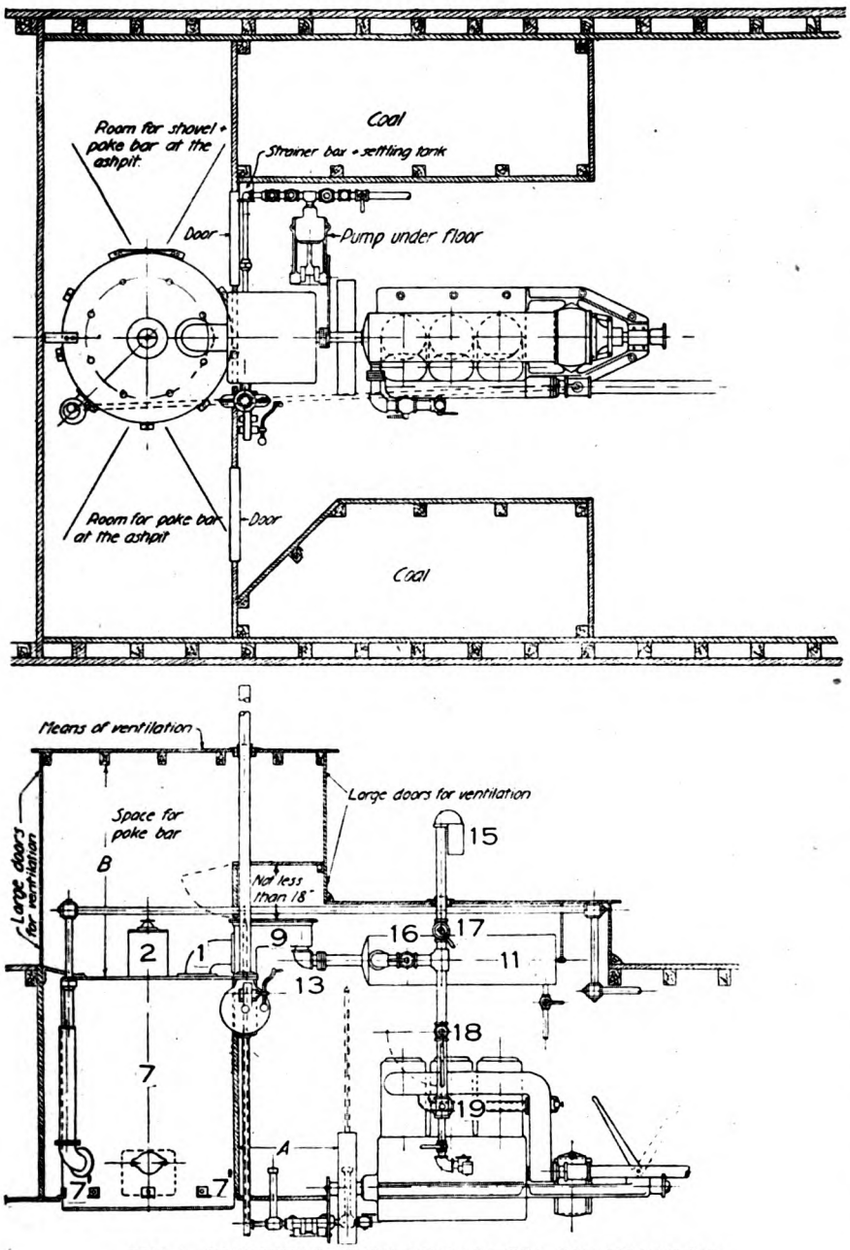

FIG. 4—SECTIONAL VIEW OF GALUSHA GAS PRODUCER

saves the owner $7.12 a day of 10 hours work. In New York producer gas coal can be bought for $4.00 a ton. If it cost $5.00 a ton fuel expenses would be as low as gasoline at 2 cents a gallon. With gasoline at 15 cents a gallon, the saving is $18.75 less $2.50, or $16.25 per 10-hour run. In many parts of Central and in South America, as well as in some sections of North America and foreign parts, gasoline and kerosene cost from 40 to 60 cents per gallon and coal is $12 to $15 a ton. At 40 cents a gallon for oil as against coal at $12 per ton, a 100-horsepower producer boat like the Galvez would give a saving of $50 less $6, or $44.00 for every 10 hours operation. One concern found that by operating a 100-horsepower boat on producer gas they could save in fuel bills alone $1,500 in six weeks time.

In Fig. 4, which is a typical marine gas producer installation, 7 is the generator. This is simply a cylindrical shell resting on end and held down by means of the lugs 7'. In the bottom of this shell is an ash pit, above which is a shaking grate. The inside vertical walls are lined with brick. The smaller cylinder, 2, on top of the generator is the coal hopper, by means of which the generator is charged with coal or other solid fuel. What would be smoke if this device were a stove or furnace for heating a house, is in this case the gas. The gas generated leaves by the pipe elbow 1, on top, and goes to the scrubber 9. As the gas is at this time hot and dusty, it is treated with water in the scrubber, where it is cooled, washed and dried. The gas is then ready for use, and goes through pipe 13, to chamber 11, and then through valve 16, and down to the engine. Air is drawn in through pipe 15, the amount being controlled by the amount of opening in valve 17. The gas and air are then mixed, making an explosive mixture in pipe tee below 17; 18 is the throttle valve by which the speed of the engine is controlled, 19 is the intake manifold of the engine.

Fig. 5 shows the general arrangement of the towboat Webb; 63 feet long, over-all, 14 feet 4 inches beam and 7 feet depth, equipped with a 100-horsepower marine gas producer and engine. The coal consumption of this plant is only 100 pounds per hour. It is the third producer gas towboat placed in operation by one concern within 18 months.

Wolverine IV (Fig. 6), is a steel towboat 50 feet long x 11 feet 3 inches beam, and 5 feet 3 inches draft, owned by the American Fruit & Steamship Co., of New Orleans, La. This boat has been in active operation since 1910. The power

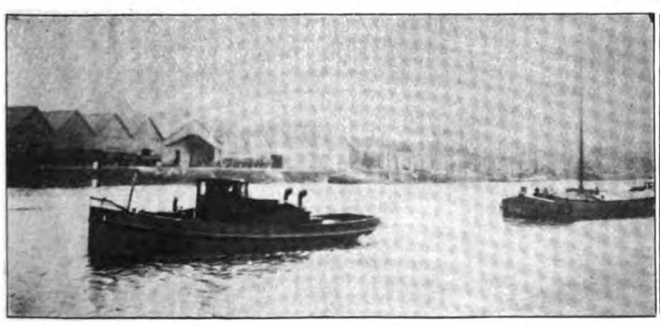

FIG. 6—WOLVERINE IV TOWING BARGE

FIG. 7—PRODUCER GAS TOWBOAT WOLVERINE I.

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equipment consists of a 75-horsepower engine and producer. According to the owners, the power plant works with the utmost regularity and with minimum attention. The boat is used on long hauls of several days' duration with the engine running full power practically all the time. The consumption of anthracite coal, about ⅜ to ½-inch in size, including the stand-over consumption at night, varies from 600 to 704 pounds per 24 hours when the boat is in operation 10 to 12 hours per day. The engine can be run dead slow or at any intermediate speeds up to about 300 revolutions per minute without any tendency to stop or without disengaging the clutch.

A recent letter from the operating engineer on this boat states that he had just come in from one of the trips this boat makes. Although using coal small in size and poorer in quality than usual he states: "We ran (continuously) for four days without the least sign of trouble and I will add that this was in a 'norther' on the Gulf (of Mexico), where I was expecting to see the producer carry off the foundation bolts, as the seas were coming right over us, but she went right on with her work and never gave us the least bit of trouble and the fuel consumption was well within one pound per horsepower hour."

As a consequence of the satisfactory results obtained with the Wolverine IV the American Fruit & Steamship Co. have added at least half a dozen producer gas propelled boats to their fleet during the past year.

What is probably the smallest producer-gas towboat is the shallow-draft tunnel stern boat Wolverine I. This is shown in Fig. 7. The boat is 32 feet long and has a draft of about 18 inches. The gas producer and engine are of 18 horsepower.

FIG. 8—GALUSHA GAS PRODUCER POWERED TOWBOAT TEDDY

Another shallow draft, semi-tunnel stern boat, although of somewhat larger size, is the Teddy, shown in Fig. 8. The boat is in use night and day and covers a course of several hundred miles each way. The 40-horsepower gas producer installed is in charge of Mexicans, half Indian, and in operation consumes 39 pounds of charcoal per hour. This fuel is said to give almost no ash and to produce an excellent grade of gas for the engine. Equally good results are obtained when using coal as fuel. The engineer furnishes the following information: "I run this on a long tow of 81 hours without a stop. She uses on this trip about 3,450 pounds of anthracite coal, costing $8.00 per ton, delivered in this part of Mexico. This is a cost of about $14 for coal for 81 hours operation. Now the same size and make of engine operating in a sister boat, on gasoline fuel, uses more than 400 gallons for the same length of trip. As gasoline costs 55 cents a gallon here, this means an expense of $220, for gasoline to develop the same power that the gas producer on this boat gives from $14 worth of coal. This is some saving, I believe."

The towboat Dawn (shown in Fig. 9), which is owned by Locke-Moore & Co., Ltd., is 65 feet long, 14 feet beam, and 6 feet deep, equipped with a 100-horsepower gas producer plant. The boat is engaged in towing logs down the Calcasieu river, a distance of about 35 miles. Forty hours are required to make the trip, bring down an average load of 2,000 logs. According to the owners, the consumption of coal is 100 pounds per hour, or 4,000 pounds for the trip, costing $16.50 or 44¼ cents per hour. If the engine is run on gasoline, instead of producer gas, it burns 20 gallons of gasoline per hour, or 800 gallons on the same trip, costing $96 for the trip, or $2.40 an hour. Boats of the same power engaged in the same work, equipped with a steam plant burning wood as fuel, cost about 75 cents an hour for fuel, in spite of the fact that wood is the cheapest fuel to be had in that locality. In other words, the steam-tug fuel bill is 80 per cent greater than that of the producer-gas tug. In addition to this, the steam tugs are obliged to have an additional man on board as fireman, costing $2 per day.

A good number of freighters, tugs, yachts, etc., equipped with American built engines and gas producers have been operating on the waterways of Europe for a number of years. The results on the boats Zeemeeuw II and III, are typical. Of the Zeemeeuw III the owner says: "Everything has worked most satisfactorily. . . . Laden with about 150 tons dead weight cargo in still water we obtain a speed of 12 kilometers (about 7½ miles) the propeller turning at

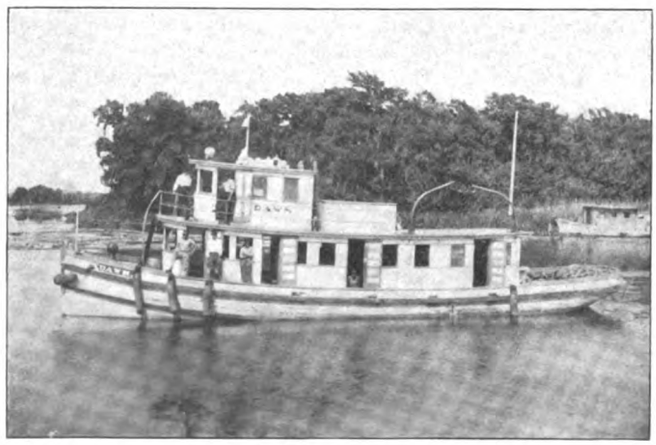

FIG. 9—PRODUCER GAS TUG DAWN

FIG. 10—PRODUCER GAS TUG DART

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415 revolutions. Coal consumption averages 190 to 200 kilos (418 to 440 pounds) per day of 12 hours running, and 12 hours standing over. We pay for this coal here approximately Frs. 20 ($4.00) to Frs. 22 ($4.40) per ton, which makes an average consumption per day of Frs. 4.20 (84 cents) against Frs. 25 ($5.00) per 12 hours run on low-grade oil, or $10 on gasoline. We are exceedingly pleased with this outfit."

About two years ago the Clooney Construction & Towing Co., of Westlake, La., fitted out their tow boat Dart (Fig. 10), with a 50-horsepower producer; one year later they bought a 100-horsepower producer on the strength of the other's performance, this second plant going into their Dawn, used for towing lumber. We learn that results have resulted in another order for a 100-horsepower producer for a duplicate of Dawn.

Here is the work that has been done. The owners wrote in July of last year regarding the Dart: "This boat is equipped with a Galusha gas producer and a Wolverine engine. The vessel burns approximately 50 pounds of coal per hour, and on gasoline approximately 15 gallons. Coal costs us $8.25 per ton and gasoline 12 cents per gallon. Thus it will be seen that to run the boat one hour on producer gas costs us in round figures 25 cents, whereas the run of one hour on gasoline means a fuel cost of $1.80. A striking illustration of the difference in fuel cost was made by this tug in towing barges to Port Arthur, Tex., from our plant at Westlake, on the Calcasieu river, which in part is an open sea tow. Before the installation of the producer-gas machine in this boat, we made the tow of one barge 130 feet x 30 feet x 9 feet, light. It took us 20 hours to make the trip of 90 miles, hence we burned 300 gallons of gasoline, for which at the time we were paying 15 cents per gallon, or a total fuel cost of $45. Immediately after the return of Dart we placed the producer gas plant in her (the same engine being used) and three weeks after the first tow we made the same tow exactly, taking over a duplicate of the first barge; it took us 21 hours to make the run. We burned 1,050 pounds of coal, which at $8.25 per ton means a total fuel cost of $4.33, a difference in favor of the coal and the gas producer over gasoline as fuel of $40.67 in a 20-hour run."

The beautifully built and equipped private yacht of Geo. L. Friar, is a fair example of the application of producer gas to this type of craft. Safety, with insurance rates but half as great as is the case where gasoline is used, is very desirable. It is found that coal, coke, or charcoal, can usually be procured even in out of the way places, where one can not procure gasoline and other oils.

To sum up: Marine producer gas power plants, built by experienced American marine producer people, are giving excellent results in freight boats, passenger boats, fish boats, tow boats, auxiliary sailing boats, yachts, and shallow draft barges. Operation is just as satisfactory in stormy weather at Cape Hatteras or along the dangerous coasts of the Gulf of Mexico, as it is on the perfectly calm waters of our inland waterways and on the canals of Europe.

The producer meets well the demands of 24-hour full power service and the constantly changing demands of the tow boat which is manipulating in the midst of crowded shipping. It, at present, should be carefully looked up by any one requiring power in units of from 25 or 50 horsepower up to 500 horsepower.

Passenger Steamer Sioux

The inland passenger steamer Sioux operating from Seattle ran aground during a dense fog remaining hard and fast for six days until she was released by the efforts of two immense dredges.

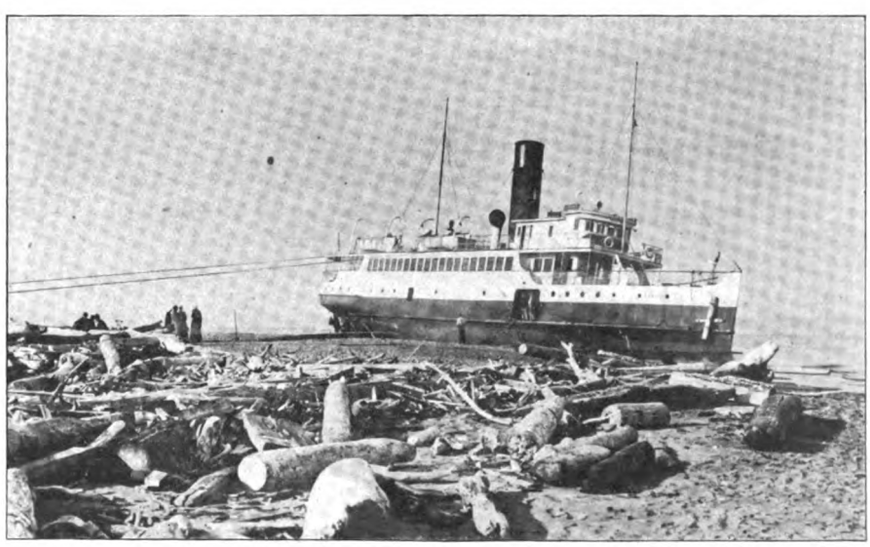
The accompanying photograph shows the Sioux lying on Dungeness Spit in the Strait of Juan de Fuca and to her stern is seen the hawser on which three tugs had pulled in an unsuccessful effort to pull her off. The tugs labored three days but without avail, each succeeding tide carrying the vessel farther inland where she was held fast in the shifting sands. The picture shows her high and dry at low tide. Finally it was feared she would be a total loss but eventually the dredges went to work. One of the clam shell variety dug a channel on the seaward side while a suction dredge labored on the inshore side. At last a deep channel was dug and the Sioux was floated into deep water. Examination proved that she was undamaged by her week's stay on dry land.

The Sioux was built in Seattle two years ago and is one of the fastest and best equipped vessels of her kind in these waters. Until her present mishap she had been operating regularly without an accident of any kind.

Charles Lamy & Sons' Store

Last season the Lake Carriers' Association started a campaign in behalf of cleanliness in handling food products intended for consumption aboard ship. Practically all the supply houses along the whole chain of lakes were advised of this purpose and during the year personal visits were paid to them by some of the commissioners of the Lake Carriers' Association. There was a noted improvement all along the line and in certain instances there was little left to be desired in the way in which the stores were kept. This was especially noticeable in the store of Charles Lamy & Sons, Buffalo. The store of this firm is about as orderly as a grocery store can possibly be. The campaign carried on by the Lake Carriers' Association had definite results as there was a sensible reduction in the number of cases of illness aboard ship. Considerable vigilance was also displayed over the drinking tanks which undoubtedly had a great deal to do with the results achieved.

The Western Cedar & Lumber Co., Alpena, Mich., is making repairs on its steamer Helen C., making new hatch covers and putting on a new main mast. A new foremast was put in early last fall.



STEAMSHIP SIOUX ASHORE ON DUNGENESS SPIT

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March, 1915

Federal Shipping Board

The committee on merchant marine of the Chamber of Commerce of the United States has outlined a practical plan for the development of our oversea commerce, the particulars of which will be found on the opposite page. The committee has not been afraid to express its convictions. It believes the proposed ship purchase plan of the government to be wrong in principle and it also believes that the only way to create an adequate merchant marine is by reasonable government assistance to private initiative. That is really the only way in which it can be done and the sooner the country recognizes that fact, the sooner we will have a merchant marine. The committee, however, goes a step further and advocates the formation of a federal shipping board and a marine development company, the company to advance funds to buyers and builders of steamers and the board to supervise our shipping. Should a federal shipping board be created it would obviously lift the whole question of our merchant marine out of politics and this alone would be a tremendous step forward. Nothing will be accomplished so long as the question is regarded as a partisan one. A federal shipping board, composed of experts, to have full control of our oversea transportation could speedily get things down to a practical working basis. In fact, the creation of a small compact body is essential in dealing successfully with such a highly technical thing as our oversea shipping is. The committee has certainly made a step in the right direction and has given the commercial bodies of the United States a definite foundation to stand upon.

Coast Ship Yards Busy

The ship yards on the Atlantic seaboard are fast filling up with orders and none of the yards will probably have a vacant berth during the whole of 1915. In fact, some of them are already booked up to 1916, and altogether the outlook is very gratifying. This program, which is the best that the coast yards have had in many years, is due directly to the European war which has deranged shipping generally and has caused the withdrawal of thousands of ships from active service. The sudden subtraction of so much tonnage has obviously set freight rates soaring and they have reached a point hitherto unknown. The rates are so high that a steamer of the ordinary ocean type could probably pay for itself within a single year. It is too bad that the country has no ships to participate in these handsome profits now, but congress has always lent a deaf ear to the country's appeal on this score and the trade is consequently suffering by reason of past indifference. No one can tell how long this period of high rates will prevail, but it will undoubtedly last as long as the war. There is a sensible increase in demand from foreign countries for our products, even interior furnaces receiving inquiries from Great Britain for pig iron. This demand upon our resources will increase as time goes on and new avenues of trade will undoubtedly be opened up. American steamship interests have risen to the occasion and in defiance of the preposterous measures projected by congress are entering the market for new tonnage in numbers. Eastern ship yards are in for a full measure of prosperity and they certainly deserve it, for they have kept their organizations intact when there was nothing in sight.

Grain Shortage Settled

That fairness and right will triumph in the end is well shown in the recent adoption of the Lake Carriers' bill of lading. Ever since grain has been carried on the lakes the vessels have been required to guarantee elevator weights, which was obviously an injustice, as they had no control over them. Yet, if the grain weighed out at less than it weighed in, the vessel was required to pay for the shortage. For over thirty years vessel owners have protested against this injustice, but without relief. During the past season shortages were frequent and heavy, sufficient to more than absorb the profits of the trip, and the vessel owners were compelled as a body to flatly state that they would no longer guarantee elevator weights. They did, however, offer to bear the natural wastage of the business which statistics prove to average about one-quarter bushel per 1,000 bushels carried. This shortage will be allowed on every cargo carried and deducted from the freight money. The proposition is eminently fair to the grain shippers and it removes an irritating thorn from the vessel owners' side. It also places the grain trade on practically the same basis as the coal and ore trades.

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Federal Shipping Board

Its Creation is Advocated by the Committee on Merchant Marine of the Chamber of Commerce of the United States as a Means of Lifting the Whole Question of Oversea Shipping Out of Politics

ONE of the most striking incidents of the recent convention of the Chamber of Commerce of the United States in Washington was the vigor in which the question of rehabilitating the American merchant marine was approached. The government ship purchase bill, projected by the administration, was absolutely repudiated, and as the chamber is made up of men of every line of industry in the United States, their action can be regarded as reflecting the general sentiment of the business interests of the entire country. In fact, this government ship purchase bill is really one of the most preposterous measures that have ever been introduced in congress, and the surprising thing is that it should ever have been given serious consideration. The chamber's special committee on merchant marine submitted a plan for the upbuilding of an American merchant marine which had previously been approved by the board of directors and will be submitted to a referendum vote of the individual chambers of commerce throughout the country.

It is quite clear that the committee in drafting the plan desires to lift the whole question out of politics altogether and treat it in a wholly non-partisan manner, which is really the only way to deal with the question. The salient features of the plan as proposed by the committee are:

The government should create a permanent federal shipping board composed of five persons of recognized ability and experience in marine transportation. This board is to be appointed by the President and is to be strictly non-partisan. The primary purpose of the board is to encourage the establishment and successful operation of an American merchant marine. As an important factor in the problem, the board should make a thorough investigation of our present navigation law and recommend to congress such revision as it may deem essential or desirable. The board is to have full jurisdiction, under the law, in all matters pertaining to oversea transportation. Subject to such restrictions as congress may impose, the federal shipping board is to have authority to lend for a period of seven years to persons or corporations of satisfactorily demonstrated ability who desire to engage in oversea transportation — preferably on routes between the United States and foreign ports to be approved by the board— such percentage of the cost of building or purchasing ships as will afford a safe margin upon the investment, such as loans to be made at a fair rate of interest, the time of loan to be fixed by the board and to be secured by the first mortgage bond upon the ship or ships with provision for amortization.

To provide the necessary funds, a marine development company with a capital of $30,000,000 may be incorporated, the entire capital stock to be subscribed for by the United

RECOMMENDATIONS OF MERCHANT MARINE COMMITTEE OF CHAMBER OF COMMERCE OF UNITED STATES.

1.—Your committee consider that, owing to the world's shipping conditions, government aid is absolutely essential to upbuild our merchant marine, and we recommend it be freely and adequately given.

2.—We believe the proposed government plan of purchase or construction, even if operation is avoided by chartering to private persons, is wrong in principle and unwise if the result sought can be secured by private initiative supplemented by reasonable government aid.

3.—The success of other nations in giving direct aid to establish oversea mail and freight lines should not be disregarded, unless we are satisfied equally successful results can be accomplished by better, cheaper and more efficient methods.

4.—We advocate the formation of a federal shipping board and a marine development company as outlined, the company to advance funds to buyers or builders of steamers and the board to supervise our shipping, with full authority to handle all matters pertaining to our oversea transportation.

5.—We strongly recommend that government license to operate shall be taken by all lines, domestic or foreign, engaged in shipping between ports of the United States and other countries.

6.—We recommend amending the law for mail carrying purposes, the speed of first and second-class steamers being lowered and adequate compensation provided.

Your committee believe that the entire country is now aroused and that they desire this great national question settled by prompt government action to restore our maritime power. This stain on our national escutcheon, this menace to our commercial advancement and prosperity, this danger to our nation's greatness and source of weakness in case of war, this cause of irritation and loss of pride to every man that loves his country, this almost unexplainable position by reason of our unparalleled success in other directions should be swept aside, so that no longer shall our national progress be retarded. Our people wish to see the Stars and Stripes again fly proudly on every ocean, and in every port, and the right of our merchants to control our export and import commerce again realized for the protection of American industries. Until this comes about, our people will not rest content, nor should they, if we still possess that national pride left to us as a proud heritage by our forefathers.

WILLIAM HARRIS DOUGLAS,
Chairman.

JOHN A. PENTON,
LUDWIG NISSEN,
BERNARD J. ROTHWELL,
H. A. BLACK,
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States and held in trust by the federal shipping board; the $30,000,000 thus appropriated from the national treasury to constitute the maximum obligation of the United States in connection with this undertaking.

The bonds to be guaranteed as to principle and interest by the Marine Development Co. and offered for sale to the public upon a slightly lower interest-yielding basis than that paid by the borrower; the accruing profit to provide for the expenses of the federal shipping board and of the Marine Development Co., any surplus to be applied to a sinking fund or contingent fund.

The proceeds of all sales of bonds are to be reinvested similarly at the discretion of the board during the period named.

Not Opposed to Subventions

The committee which drafted this measure consists of William Harris Douglas, chairman; John A. Penton, Ludwig Nissen, Bernard J. Rothwell, H. A. Black and Thomas L. Stitt. The committee believes that under the proposed plan funds essential for legitimate shipping operations can be obtained and that desirable mail and freight lines can be built up quickly if supplemented by direct government aid for service rendered to overcome the extra operating disabilities to which American vessels are subject in the oversea trade. The objects sought, of course, are the establishment of mail, passenger and freight lines to foreign countries, as well as the upbuilding of a general mercantile fleet so as to overcome the loss, inconvenience and general disadvantage of having our commodities carried abroad almost exclusively by aliens. The committee quite courageously says that only through government aid can these necessary safeguards for our future commercial advancement be obtained. The committee adds:

"These results secured, the American nation will be in a position to furnish quickly, and at small cost, the necessary transports, colliers, auxiliaries, repair ships, etc., of every type, size and speed required by the government in case of war or any other emergency. It will make possible a clearer relationship between the army, the navy and the merchant marine, which is so desirable for our national defense, and which has proven so beneficial to other countries. The committee also believe that it will enable the government to avoid the now existing necessity of building at a great expense many vessels for such purposes and of maintaining them for long periods without benefit to the nation."

It is pointed out that the great maritime nations have not hesitated to pay large amounts yearly in building bounties, mileage subsidies, mail subventions, etc., recognizing the great advantage from a national and commercial standpoint, "but we find no instance where a European government has gone into shipping operations itself".

"We question," the report says at another point, "whether the American people are so strongly opposed as is claimed to the payment of reasonable subventions, which many think is the simplest, and probably the most inexpensive, method to establish mail lines to South America and elsewhere. Under this plan no responsibility rests with the government, contracts are made and bonds are given to faithfully fulfill obligations entered into, and the cost is defined and limited."

As an alternate proposition, the report states, the existing ocean mail act can be amended to provide a justifiable and fair remuneration. The committee suggests that the speed of vessels be reduced to 16 knots on first class ships, instead of 20, as is now the law; and on second class vessels, where the law now calls for 16 knots, that the speed be reduced to 12 knots, adequate compensation being allowed to establish lines desired.

Alien vessels used to establish over sea lines, it is declared, should be replaced at agreed intervals by American-built steamers of such construction and speed as will meet future reasonable naval requirements, so that the lines established ultimately would operate only such vessels as are built in American ship yards, thus aiding this great industry now languishing for want of work.

Supervising Ocean Freight Rates

If rates are to be agreed upon, as is done by foreign shipping interests, the committee says it is certainly much more to our interest to have the schedule arranged here, "or at least we should be in a position to have a determining voice in their fixing".

The committee approves of pending legislation providing for supervision of ocean freight rates, authority to be placed in the hands of the federal shipping board. The committee makes no definite recommendations regarding the upbuilding of our ship yards, believing that if policies suggested be carried out, in whole or part, it undoubtedly will result in the advancement of the prosperity of this industry, "which it should be our duty strongly to encourage". The present higher cost of building in Europe, it is stated, a condition created by the war, also may lead to the building of vessels in the United States.

"The belief is widespread," the committee asserts, "and experts say is well founded, that our navigation laws in many particulars weigh heavily on our shipping, placing us at a disadvantage, especially in the building up of a general merchant marine. This matter should be thoroughly investigated by the federal shipping board, and a proper revision accomplished through congressional action. We refer to the very strict regulation of American citizenship for officers and crew, the obligation to employ more men on deck and in the engine room than are carried on foreign ships, various requirements which add to the expense of operation, proper modification of our basis of measurement to reach an international standard, and various regulations regarding construction, etc."

American Citizens as Officers

The committee advocates that the federal shipping board shall be given authority and sufficient funds to take up the important questions of securing American citizens to command and officer our fleets, including the providing of competent men for the engineering department, held to be a national necessity; the training of young men as seamen, with the suggestion that the large number yearly discharged from the navy, after receiving a valuable training, might be encouraged to go into the merchant marine and if paid a yearly retainer perhaps could be induced to join a government naval reserve. The committee also says that freight steamships engaged in foreign trade not operating in main lines, but built under naval designs and carrying apprentices pledged to government service, also well might be paid proper compensation.

"Legislation of a national character," the committee says, "which reaches and benefits the greatest number of our people is wise legislation, and we believe that past prejudice against government compensation to shipping, on the theory that it is class legislation, has now passed away."

The committee, speaking of the ship purchase bill now before the senate, says it is of the opinion that government ownership, combined with operation, is unwise and advocates its avoidance. It says:

"Your committee are of the opinion that government ownership, com-

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bined with operation, is unwise, and advocates its avoidance, which opinion also seems to be the general verdict of the business world. Our government might better profit by the successful experience of others, and not establish the precedent of even temporary experimental competition with its own citizens.

"Government operation is un-American, is likely to be more extravagant and expensive than private control, and will seriously interfere with individual initiative and retards the enterprise of our citizens.

"The alien lines now operating would be forced into competition with our government, or joint co-operation would have to be entered into or acquiesced in, if uniformity of rates was established; an action which might lead to undesirable complications. If the government operated vessels of considerable speed, and rate competition was severe the lower speed steamers of the alien lines would make money, while the government line would lose heavily.

"The great problem of your committee is to determine if our desires can be realized in a better way than by the government program, as we fully appreciate that a policy should not be disapproved unless such disapproval is based on good ground, and also accompanied by suggestions and feasible plans to accomplish better and more economically the purpose desired, so as to appeal to public sentiment and to congress."

Submitted to Referendum

The plan that is advocated by the committee received 163 ayes and 90 nays, but as a two-thirds vote was required to pass it, it was obviously defeated. The convention then voted to submit the report to a referendum of the individual chambers of commerce throughout the country. It had previously, however, registered an overwhelming vote against the government ship purchase bill.

In discussing the report of the committee, Mr. Douglas said he regretted that the question of our merchant marine has not been treated in a non-partisan manner. He said that it would continue to be treated as it has been until the business men of the country imperatively demanded that it be taken out of politics. He said the committee had approached the subject in a spirit of fairness, equity and justice to the American people. He added that those who are voting for the ship purchase bill are not exercising their own convictions, but are simply voting to support the administration. He declared that governmental aid is absolutely necessary to meet the competition of foreign ships which operate under conditions that impose a heavy handicap upon American tonnage.

Defending the loan of $30,000,000 by the general government to the proposed Marine Development Co., Mr. Douglas said the loan would be perfectly safe and secured by interest-paying bonds. He declared, however, that his mind was open to conviction, and he would not object if that provision was stricken from the report. He said the plan was not a bill, but was put forward in order that a common ground could be reached. The plan was discussed pro and con by a number of speakers and was finally, as previously stated, submitted for referendum.

Torpedo Boat Destroyer Cushing

The torpedo boat destroyer Cushing was launched from the yard of the Fore River Shipbuilding Corporation, Quincy, Mass., on Jan. 16. She is 305 feet 3 inches long, 31 feet in breadth, 18 feet 3 inches in depth, and has a displacement of 1,050 tons on a mean draught of 9 feet 5½ inches. She is of the usual torpedo boat destroyer design, with high forecastle—the model for which has proved so successful that it has been practically standardized by the navy department for this type of vessel.

The hull is built entirely of steel and is divided by watertight and oil-tight bulkheads into 14 principal watertight compartments. All the strength members of the hull are of a special high tensile steel, which increases the strength of the vessel by about 33 per cent. Fuel oil tanks are incorporated in the vessel's structure capable of carrying about 93,000 gallons of fuel oil for firing boilers.

The armament of the Cushing consists of four 4-inch rapid-fire guns and four twin torpedo tubes—all having a large arc of fire.

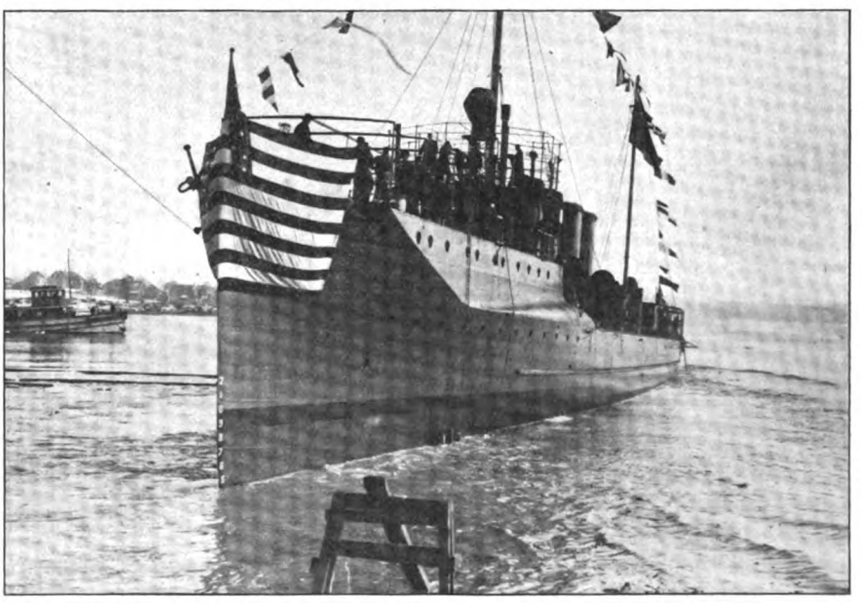
An elaborate electric plant is installed with powerful searchlights and a radio telegraph equipment.

In view of the strenuous life experienced during maneuvering and in warfare by the officers and crew of vessels of this type, special attention has been paid to the living spaces, and very comfortable quarters are provided for six officers, eight petty-officers and 86 men.

The propelling machinery consists of two sets of Curtis turbines in combination with cruising turbines and reduction gears—all of the latest design and most modern type for driving the vessel at a speed of 29 knots per hour. There are four water-tube boilers of the Yarrow-Fore River type, placed in two watertight compartments, fired by oil fuel and designed for a working pressure of 265 pounds per square inch.

The Cushing will be launched with smokestacks and mast in place and will be about 85 per cent complete when she enters the water. Work will be rapidly pushed to completion with a view to the vessel going on her trial trips within the next few weeks.

The Submarine Signal Co., Boston, Mass., has issued a little calendar containing a reproduction in colors of the Rainbow, of 750 tons, formerly engaged in the China and South American trade.



TORPEDO BOAT DESTROYER CUSHING

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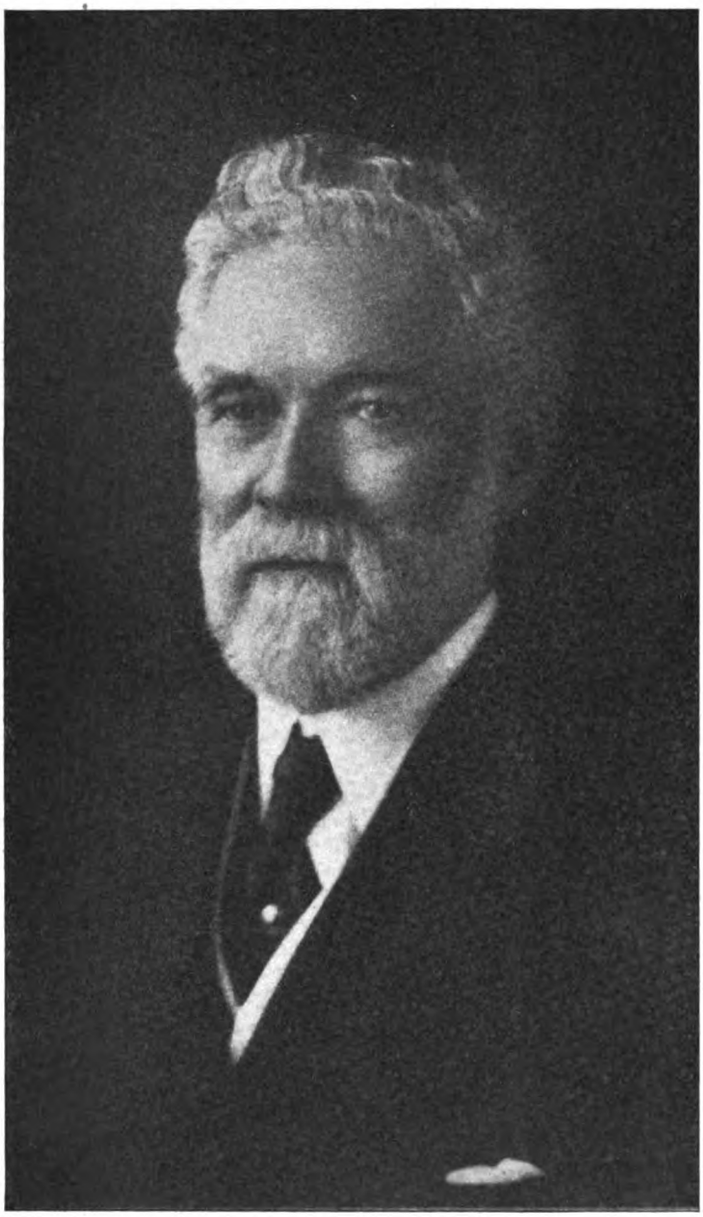
Lake Carriers' Association

Vessel Owners Are Looking Forward to a Somewhat Better Year—Personal Injury Cases Diminished—Welfare Work

THE annual meeting of the Lake Carriers' Association was held at Hotel Tuller, Detroit, on Jan. 21. The date was coincident with the seventy-first birthday of William Livingstone, president of the association, and obviously added interest was lent to the occasion by this circumstance. The annual dinner which has always marked the conclusion of the convention was an unusually happy one, Mr. Livingstone receiving congratulations from all sides. In his report the president made it clear that 1914 was one of the worst years from a business standpoint that the lakes have ever experienced. His unfailing optimism, however, predicted a better one for 1915 and, in fact, his conclusions were based upon sound reasons. There is good reason to believe that 1915 will be a year of marked recovery.



WILLIAM LIVINGSTONE
President

From the operating standpoint lake trade showed a considerable increase in efficiency. While no cargo carrying records were broken, the average ore cargo carried was the highest ever, 8,424 tons, and while neither loading nor unloading records were broken, the average stay in port receiving and discharging cargo was considerably diminished. In fact during the past six years it has been practically cut in half. Single records of dispatch either in loading or unloading are usually pre-arranged or may be due to fortuitous circumstances and are accordingly meaningless, whereas averages, which are the result of ordinary practice, mean a great deal.

From the underwriters' standpoint also the season was quite gratifying owing to prudent navigation in thick weather and to the adoption of separate courses for east and west-bound vessels accidents were few, and serious ones were fewer still.

President Livingstone showed that the new subtraction in the freight movement from that of 1913 was 27,078,861 net tons. Impressive as these figures are he did not regard them as alarming because an occasional lean year is to be expected. He dwelt upon the work of various committees of the association and especially upon the care which has been exercised regarding food supplies. The water supply has also been safeguarded and the drinking tanks are filled with water drawn from sources of undoubted purity. Relations with labor continued quite satisfactory throughout the year and notwithstanding the depressed industrial conditions no change was made in the wage scale.

The association amended Article 5 of its constitution to increase the directorate from 35 to 40. Carl Joys, of Milwaukee, and W. P. Schaufele, of Cleveland, were added to the board. The directorate consists of: J. H. Sheadle, H. Coulby, John Mitchell, H. D. Goulder, W. C. Richardson, J. S. Ashley, W. H. Becker, W. A. Hawgood, Walton H. McGean, A. F. Harvey, H. K. Oakes, George M. Steinbrenner, Roy A. Williams; J. Burton Ayers, W. G. Stewart, John T. Kelly, A. E. R. Schneider, C. C. Canfield, W. M. Williams, R. D. Mitchell, A. T. Kinney, A. W. Thompson, W. P. Schaufele, of Cleveland; D. Sullivan and A. C. Sullivan, of Chicago; C. D. Dyer and W. P. Snyder Jr., of Pittsburgh; W. Livingstone and L. C. Waldo, of Detroit; Charles M. Heald, W. E. Lloyd, J. T. Boland, J. B. Rodgers, Buffalo; G. A. Tomlinson, Duluth; Howard L. Shaw, Bay City; H. S. Wilkinson, Syracuse; John Craig, Toledo; W. M. Mills, North Tonawanda; W. H. Smith, Montreal; Carl Joys, Milwaukee.

All of the old officers were re-elected as follows: President, William Livingstone, Detroit; vice president, J. H. Sheadle, Cleveland; treasurer, Capt. George P. McKay, Cleveland;

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secretary and assistant treasurer, George A. Marr, Cleveland; counsel, Harvey D. Goulder, Cleveland; shipping commissioner, A. R. Rumsey, Cleveland. The executive committee consists of William Livingstone, J. H. Sheadle, H. Coulby, Capt. John Mitchell, Charles M. Heald, Capt. D. Sullivan, G. A. Tomlinson. The alternates are Capt. W. C. Richardson, A. F. Harvey, H. S. Wilkinson, W. L. Floyd and John T. Kelly.

Frank B. Smith, chief engineer of the Pittsburgh Steamship Co., gave a talk on the steamboat inspection rules and the different interpretations that are placed upon them by the various inspectors. He suggested the advisability of certain amendments and proposed that vessel owners act as individuals in sending masters and engineers to Washington to confer with the board of supervising inspectors. He said that it was really difficult to get second engineers. Young men in qualifying before the steamboat inspectors are granted licenses which entitle them to apply for positions as first assistants though their practical experience does not justify their appointment to so important a post; yet rather than accept the position of second assistant many of them will stay on dock until a first assistant's position shows up. He suggested an amendment to the rules which would authorize granting a license as second assistant upon 24 months' experience.

H. Coulby, president of the Pittsburgh Steamship Co., possesses an extraordinary faculty of driving his meaning home by homely illustrations. He said that work was quite slack on his farm and that the third horse had nothing to do. "I think," said he to his foreman, pointing to a very good looking horse, "that I'd keep this one."

"Well," replied the foreman, "if he was mine I think I'd sell him."

"Why?"

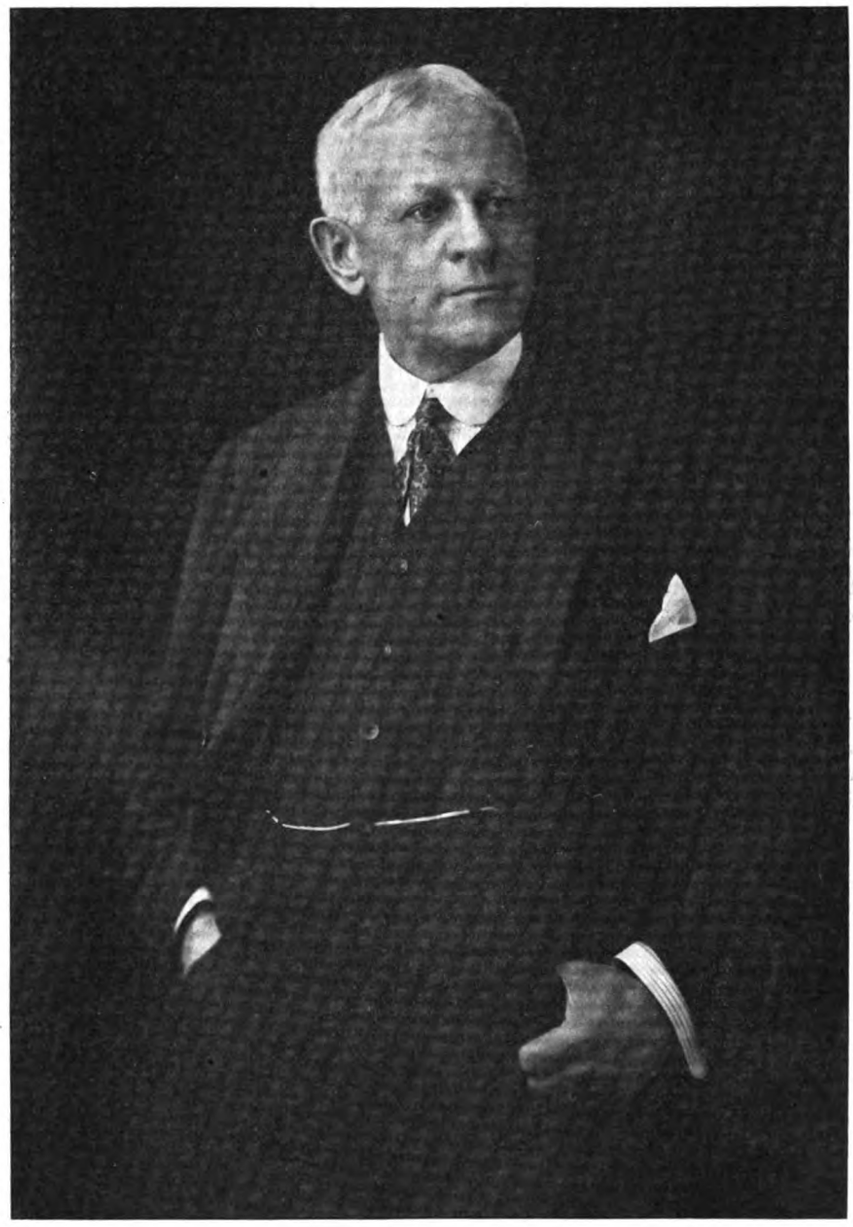
"Because he is not any good in team work."

"Well, then, that's the horse you want to sell."

Looking back, Mr. Coulby said that there has been a great advance in team work.

"We have all done well as owners," he said, "but the masters have also helped us out. I was never more struck with anything in my life than the captains' recommendations to forbid liquor aboard ship, when you and I know that in the old days whiskey was about the first thing that got aboard. We have gone a long ways toward the elimination of personal injury cases. In my two companies we have made a personal injury campaign. All our ships flew pennants in the forward and after ends and it was the understanding that these pennants were to be kept flying so long as no injury occurred that meant a loss of time. If a ship came through the season without an injury the second mate got $25 and the second engineer $25. The Pittsburgh Steamship Co. reduced its personal injuries by 68 per cent and in the Interlake company all but five ships carried the flags throughout the whole season. There was no philanthropy in that. It was purely an economic proposition. The mate was watching the line as well as the man handling it and if there were any places over which a man might trip you can depend upon it that they were fixed. I am just giving you facts. The record of the Pittsburgh fleet before 1914 was a good record, just as good as anybody's. The same thing is true in relation to the elimination of accidents to vessels. We had only two grounding accidents in the Pittsburgh fleet and as for the Interlake we did not spend a single dollar. These facts show that we had the hearty co-operation of all men in the employ.

"I want to say a word on the question of east and west courses. I don't say that the courses are responsible for all the improvement but they certainly contributed their share. Navigators are taking it up more and more and I am personally deeply interested in it.



J. H. SHEADLE
Vice President

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"Apparently, however, I did one thing that was misunderstood. I can't get around the lakes personally more than once or twice during the season. Sometimes I am lucky if I can get around once and, therefore, I asked my masters to let me know how the courses were being observed. Some apparently thought that I was spying, but I would be the last one on earth to spy or cause any master to lose his job. I have always been on the master's side. I am deeply interested in the elimination of accidents and believe in giving bonuses when results are achieved. I am a believer in the old Carnegie doctrine that when a man saves money for the company he should be given a little of what he saves. I should therefore like to see some system of classification so that masters may get a part of what is annually saved through their carefulness."

Grain Shortage

Archie Thomson gave a talk on the grain shortage question and said that every vessel owner would be remiss in his duty if he did not devote sufficient time to understand this subject fully. He then recounted all the preliminary steps which led up to the adoption of the lake carriers' bill of lading which is now being generally accepted by the grain shippers.

Captain D. Sullivan, of Chicago, stated that the warehouse men at Chicago had made a flat proposition of 50 cents per 1,000 bushels for trimming the grain fleet provided they could get all of the Lake Carriers' work. This work has hitherto been performed by the crew, for which they are paid extra, but Capt. Sullivan did not believe the crew to be at all times capable of doing the work. All grain vessels trim at Duluth, for which a charge of 40 cents is made, and upon motion of Mr. Coulby Capt. Sullivan was authorized to make the best arrangement with the warehouse men for trimming, adding that they could trim all of his vessels.

Mr. Coulby discussed the new grain bill of lading briefly. He made it clear that the new bill of lading does not relieve the ship of her proper liability. He said the trouble was that in the past the ship was acting in the dual capacity of carrier and of guaranteeing elevator weights. There is a natural wastage in the trade which has been proved by experience extending over a series of years, to work out at ¼ bushel per 1,000 bushels. The vessel's moral share in this wastage he held to be one-half, but in order to avoid argument the vessel had agreed to stand it all. The bill of lading does not, however, cover cases where there is proved delinquency on the part of the ship, such as leaking into bilges. The elevator men, he said, would like to have had the old arrangement continued, but it was generally admitted that it was unfair to ask the boat to bear the loss of that which had never been put aboard at all.

The work of the welfare plan committee was outlined by J. H. Sheadle, vice president, who said:

"A general review of the welfare department has been presented in the president's annual report, and I will therefore only touch upon some of the most salient features.

"Perhaps the most conspicuous activity the past year has been in the line of sanitation. The conservation of the health of men is the most important one thing that can enlist the attention of the employer, and the more successful the employer is in safeguarding the health of the employe the greater the efficiency of his organization.

"The natural tendency of men is in the direction of better things, and all that is often needed to start them on the right course is to point out the way. Such has been the experience in the development of sanitation work the past year.

"It has been divided between two important features, attention to food supplies, and the improvement of quarters on board ship, both being perhaps already the best in the world. Special bulletins were sent out at the commencement of last season to supply dealers, ship owners and officers, setting forth the needs in this direction, and urging the adoption of certain regulations and observances.

"The response in the main was prompt and effective. Scores of letters have come to the secretary's office from the officers of the lake fleet, telling of the very great improvements shown by the dealers in food supplies, the manner in which these supplies have been handled, and the efforts made by dealers to improve conditions in their places of business.

Care of Food Supplies

"Fully 75 per cent of the dealers made changes in their stores and shops last year, looking to a better method of caring for food supplies. There still remains room for improvement on the part of some, but it is believed it will not be long before they will catch the spirit of the movement and make corrections where there are deficiencies.

"The efforts of the committee in this matter will be continued along educational lines, which, with the help of the officers on the boats, should in the near future result in the attainment of entirely satisfactory conditions.

"The moral effect of it all will be that food supplies will be handled and delivered in a modern, sanitary way by the dealer or he will find himself without the business. The men officering the ships will see to that, for none of the activities inaugurated by the Lake Carriers' Association has ever met with more ready response from the officers than this matter of sanitary food conditions.

Health of Crew

"Improvement on the ship has been equally great. Many water tanks that were not properly constructed have been overhauled so they can be frequently cleaned, and almost without exception all of the ships have followed the suggestions made as to the proper localities for the taking of water from the lakes for the use of the men. Refrigerators have been looked after as never before, and men have been forbidden the use of water directly iced.

"Here, too, the movement will gather unto itself, for the men, through the enforced observance of these precautions, will very soon begin to follow them voluntarily and thus contribute to the accomplishment of the purpose.

"Both owners and officers must continually exercise vigilance so that lapses may not occur on the part of the men, and everything that can be done in the way of arrangement and improvement on the ships should be provided, looking towards perfect sanitary conditions.

"What have been some of the results of the past season's efforts? It has been difficult to obtain full data as all the ships have not responded to inquiries as to the health of the ship's company, but from the very large number of replies received it is learned that never before has the health of crews been so good as it was last year.

"Reports as to the health of the crew were received from 233 boats and it was most gratifying to observe that there were but 11 cases of typhoid fever, only one of which was fatal, and this case developed into typhoid pneumonia. Nearly all the cases were light, with this exception.

"Almost without exception the reports from the masters contained some word of commendation of the campaign for sanitary conditions and health conditions in the lake fleet.

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More than a score of the masters referred to the necessity of having water tanks constructed so that they can be readily cleaned, and a number urged a uniform plan of water system, and several thought sanitary seacocks should be installed on all boats.

"To secure reliable figures for another year blanks should be provided for the reporting of sickness, similar to those now used for reporting personal injuries, and every boat should faithfully make a report of every case of sickness.

Personal Injuries

"In the matter of personal injuries the season's record shows improvement. It is probable that a few personal injuries were not reported, but some comparisons may be seen in the figures that follow.

"In 1913, 171 boats reported 312 injuries, or 1.82 per boat; in 1914, 160 boats reported 250 injuries, or 1.56 per boat, a decrease of nearly 15 per cent. Of the accidents in 1914, 164 were due to carelessness on the part of the injured, 59 through negligence of co-worker, and 27 were unavoidable.

"It is evident from these figures that men have been more cautious themselves, but on the other hand, those injuries which were avoidable, and cases where the co-worker contributed, increased 25 per cent over 1913, so that while there was a favorable showing in the matter of accidents to men by their own carelessness, there was an increased lack of care as to the position of the other fellow.

"This particular feature should be specially dwelt upon by the officers in their instructions to their men, because one careless or reckless employe has time and again spoiled the 'safety first' spirit of a whole group of his associates.

"As to the character of accidents, comparing those which occur more frequently, it is found there is a decrease of 47 per cent in the handling of deck engines, lines, cables and hatch covers, and a decrease of 57 per cent in injuries sustained by falling into the hold, from shelf pieces and between decks.

"The most startling and gratifying decrease is that of 5 per cent in the number of accidents attributable to intoxication. No stronger endorsement of the stand taken last year on the question of the intemperate use of liquor by the men can be presented. This effort should be continued to the point where no man under the influence of liquor be allowed to board a boat.

"The president's report records the progress made in the schools that were maintained during the winter of 1913-14. That they were appreciated may be noted from the fact that a number of inquiries were made by men during the last season as to whether such schools were to be continued another year. It may be stated that the schools are being continued with an increased interest.

"The development of this work is coming in unlooked for ways. One rainy night in early December the fleet captain of one of the companies had a call at his house from one of the mates in his line, who had come to suggest that some teaching of the practical things of the sailors' calling, be provided.

"The committee acted at once, and now, on three afternoons a week, there may be found in a number of ports schools conducted by a master or a mate, teaching interested classes of young sailors the intricacies of the bow-line hitch, stage-plank hitch, the round turn and two half hitches, the sheep's shank, etc. These practical demonstrations are followed by a talk on the compass card, or a lesson in lake courses. It is proper to record that the first class of this kind was started in the assembly rooms at Cleveland on Dec. 26, the instructor being Mate Martin Johnson.

"The methods adopted up to the present may properly be considered as experimental in enabling us to develop a system of instruction which will be the most beneficial to the sailor from the standpoint of his particular occupation while under employment on the lakes.

"It would seem that it has been fully demonstrated the men are interested in improvement and glad to avail themselves of such opportunities as are placed before them for the increase of their individual knowledge. Our own interest in the subject has grown as we have become familiar with the possibilities of this field of effort, and a better acquaintance with the men has shown us there is a manly spirit in the sailor which commands our respect.

Guidance of Younger Men

"It would seem that there must be a number of licensed men who have initiative and the gift of applying it, who might be secured from time to time in the various assembly rooms, to help guide and develop the younger men in the performance of their duties, whether they be deckhands, mates, firemen or assistant engineers.

"There are many items that might be considered in this matter of instruction, such as upkeep, sanitation, health, first aid, rust, painting, living conditions, food purchasing and its preparation, personal cleanliness, etc.

"Later, in the natural development of the work, there may come schools for licensed officers, where seamanship and engineering may be taught by special instructors if it is thought wise on the part of the Lake Carriers' Association to enter upon such a course. Then as to the efforts on the part of the ships' officers, anything they can do towards aiding the men to prepare themselves to pass the examination necessary for the securing of licenses, would be a worthy effort.

Savings Bank Plan

"In this connection it is proper to say that every officer of a ship should study the men in his crew to learn if there are any who may be helped and encouraged to the obtaining of a license.

"A systematic canvass of this matter by every owner should be made each season so that there shall be no neglect in this direction. It is a duty, not only to the men but a business obligation that rests upon the owner.

"Reference has been made to the growth of the lake marine savings plan. More and more interest is being shown by the officers of the ships in this matter, for owners and officers did not at first grasp the economic value of the work.

"They are coming to learn that in no other single line of effort can so much be done for the good of the employe; that encouragement and increasing manhood comes from the knowledge that there is 'money in the bank'. The moment men begin to save money property values begin to assume new forms, and they begin instinctively to exercise more care of the property and supplies they have under their charge.

"A comparison of the growth of the plan of banking on the boat is found in the fact that at the close of season 1911 there were 391 accounts in force, in 1912 909, in 1913 1,145, and on Dec. 1, 1914, in spite of the dull season on the lakes there were 1,340 open accounts.

"It is a trite thing to refer to the improved personnel of the men now on these lakes as compared with five years ago. A visit to the assembly rooms either in the winter or during the sailing season will attest to this statement. There is much of good there. The Victrola records of the best music are used more than those of rag time and comedy. When the stock of rec-

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ords was gone over this fall it was found that the record most worn in all the rooms was the hymn 'Abide With Me'.

"It has only been my purpose to briefly touch on a few items, but I believe the Lake Carriers' Association by the adoption and faithful prosecution of its plan of dealing with the problems of industrial relations, has become the most conspicuous example in water transportation of sane and rational co-operation between employer and employe of any place in the world.

"Relationships of this character are founded on fairness on both the side of the employer and employe, and fairness is nothing but the moral side of a question. No one can afford to take any but that side, for the moral side in all the affairs of life is but the application of good will and common sense. In other words, modern business is combining the making of money with the performance of service for others."

Great Lakes Protective Association

The Association Has Put in a Very Profitable Year —The Number of Accidents Materially Cut Down

THE ANNUAL meeting of the Great Lakes Protective Association was held at Hotel Tuller, Detroit, on Jan. 22. J. S. Ashley, chairman, presided and the feature of the meeting was the report of the year's operations. The association has during the past two years carried 25 per cent of the insurance of vessels enrolled in its membership. Prior to the meeting there had been some talk of increasing the proportion, but as a majority of the members appeared to be opposed to it, the subject was not pressed. At the suggestion of H. Coulby the matter was left to the advisory committee. Mr. Coulby pointed out that on account of the European war the foreign underwriters were not very likely to cut very much of a figure in the lake market during the coming season and that there might be a big shift in financial conditions during the next two months. He suggested that if conditions appear to warrant any increase before the opening of navigation, the advisory committee might consider it or might even call a general meeting to take action.

Ninety-seven per cent of the tonnage enrolled in the association was represented at the meeting. The old advisory committee was re-elected as follows: J. S. Ashley, J. H. Sheadle, W. C. Richardson, C. L. Hutchinson, H. Coulby, C. D. Dyer, R. A. Williams, John J. Boland, William Livingstone, D. Sullivan and W. H. Becker. The old officers were re-elected as follows: J. S. Ashley, chairman; Capt. W. C. Richardson, treasurer; Harvey D. Goulder, counsel; George A. Marr, secretary and attorney-in-fact.

Mr. Goulder suggested that it would be very helpful at the trial table if the officers of the ship actually knew how soon a ship can stop, turn and maneuver when going at a given speed, and he thought that there should be an accurate schedule on this subject. Mr. Coulby said that every master ought to have that information on the ship that he sails. It is a subject which he has brought up several times in his own company and had been working on it for years, and he regarded it as one which the individual owner should take up with his masters. Mr. Ashley in his report said:

"It is very gratifying to the committee to be able to report your operations for the year as highly satisfactory and we have abundant reason to look forward with confidence to even greater results in the future. We have been successful in further reducing our losses and are going prosperously forward toward the attainment of that end for which the association was originally founded—the elimination of the avoidable accident.

"Our operations during the season just closed present a decided contrast with that of 1913, though of course comparison made now or any other time with 1913 cannot be regarded as fair. The great November storm which wrecked so many staunch vessels in 1913 never had its equal in prolonged violence in the history of lake navigation; nor is it likely in all its peculiar phases to be again experienced. For comparative purposes, therefore, the year 1914 may be regarded as the first of your association's operations upon the basis of carrying 25 per cent of the insurance valuation.

Strengthening Deck Houses

"Since the great storm of 1913 masters are spontaneously scrutinizing weather indications with unusual care, which is highly gratifying to your committee. The master is the sole judge of the weather. No owner wants him to leave port if in his judgment it is not a prudent thing to do. In last year's report the committee stated that it was getting reports from the masters and other licensed officers of all ships which were out in the storm with the hope that something of value might be ascertained in order that all necessary precautions might be taken to avoid a recurrence of that great disaster. The evidence indicated that all of the vessels that weathered the gale had received considerable punishment to their deck houses though they were in all other respects structurally seaworthy. The deck houses, therefore, are being generally strengthened to withstand any encounter with the elements.

"Not a single total loss occurred to any vessel in our association during 1914 though the association unfortunately is interested in the loss, through collision, of one vessel not in the membership of the association. Owing to the widespread depression which practically enveloped the whole year several of our vessels were in ordinary during part of the navigable season. While there were not as many ships in commission as in years of normal activity, we do not consider the consequent relief from congestion as the greatest factor in minimizing the number of accidents, but on the contrary believe it to be due to a concert of effort to safeguard navigation in every way. More than ever before has the necessity been emphasized of a strict observance of the pilot rules by every navigator, while vessel owners have both collectively and individually insisted upon the observance of separate courses for east and west bound vessels. It is to the general adoption of this latter practice that your committee attributes the comparative freedom from collision which has marked the season of 1914, because it is a foregone conclusion that there can be no head-on collisions on these lakes if up and down bound vessels would follow separate lanes. Separate courses automatically protect the ship in thick weather and your committee has been unremittingly diligent in instructing the navigating officers that these courses must be faithfully observed. We are conscious of the fact that it is to our navigating officers that we must look for the safety of lives and properly entrusted to their care and we deeply appreciate their co-operation in the aims of the association and we hope through them eventually to reach such perfection of operation that avoidable losses will become a rarity.

"Fog and thick weather were more

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than ordinarily prevalent during the year and more than usual care had to be exercised in navigation, to which hazard there was aded a tendency to sharp fluctuations in the water levels in St. Clair river, Lake St. Clair canal, Detroit river and in the port of Buffalo, due to severe wind storms. The result of this condition reflects itself financially in our report in the form of tug bills and general average.

While it is a little early to give exact figures of the year's operation, the greater portion of our losses being based on estimates, we can safely say that the cost of carrying our 25 per cent of the insurance valuation is below 2 per cent for the navigation season, the

"Upon investigation, however, he found that there had been such a fluctuation in the insurance valuation covering the proposed period, which changes necessarily affected the rates, that such a chart would be very misleading and that the object which the committee had in view could be obtained much better by taking a modern vessel which had been fully covered by insurance during the proposed period, and show the actual cost each year for full hull insurance."

He selected the steamer L. C. Hanna. This steamer came out in the spring of 1905. Her gross registered tonnage is 6,356. She has been insured for her full hull insurance value ever since. We give below the actual cost to her

COMPARATIVE STATEMENT OF OPERATIONS—COVERING YEARS 1909 TO 1914 INCLUSIVE

Year.	G. L. P. A. %	Initial contribution.	Losses.	Expenses.	Total disbursements.	Loss.	Profit.	Per cent.
1909	5	$180,260.40	$161,946.11	$39,611.51	$201,557.62	$21,297.22	.....	11.8147*
1910	5	183,541.01	103,204.46	40,585.98	143,790.44	.....	$39,750.57	21.6576†
1911	5	130,444.23	50,031.56	29,472.24	79,503.80	.....	50,940.43	39.05 †
1912	5	158,461.73	56,970.70	32,192.02	89,162.72	.....	69,299.01	43.7323†
1913	25	486,255.44	647,576.80	30,025.98	677,602.78	191,347.34	.....	39.351 *
1914	25‡	280,898.87	131,918.71	28,281.50	160,200.21	.....	120,698.66	42.969 †
Total...		$1,419,861.68	$1,151,648.34	$200,169.23	$1,351,817.57	$212,644.56	$280,688.67	
Net profit							68,044.11	

*Loss. †Profit. ‡To Dec. 31, 1914.

Year.	Underwriters' average gross rate. Per cent.	Underwriters' average net rate. Per cent.	G. L. P. A. valuation insured.	G. L. P. A. cost was.	G. L. P. A. average rate per cent cost
1909	5.000	4.5000	$3,952,489.00	$201,557.62	5.099
1910	6.000	5.4000	4,207,845.00	143,790.44	3.4172
1911	5.625	5.0625	3,212,280.00	79,503.80	2.477
1912	5.500	4.9500	3,417,413.00	89,162.72	2.609
1913	.....	4.2025	12,034,883.00	677,602.78	5.6303
1914	..... 4.2025				
	3.5775	3.8900	10,221,462.00	160,200.21	1.5673
Average		4.6675			3.466

HAD THE ASSOCIATION CARRIED 25 PER CENT, THE RESULT WOULD BE AS FOLLOWS

Year.	G. L. P. A. valuation insured.	Initial contribution.	Losses.	Expenses.	Total disbursements.	Loss.	Profit.	G. L. P. A. average rate per cent cost.	Per cent profit.
1909	$19,762,445.00	$901,302.00	$809,730.55	$30,000.00	$839,730.55	.....	$ 61,571.45	4.2491	6.8338
1910	21,039,225.00	917,705.05	516,022.30	30,000.00	546,022.30	.....	371,682.75	2.5952	40.501
1911	16,061,400.00	652,221.15	250,157.80	30,000.00	280,157.80	.....	372,063.35	1.7443	57.046
1912	17,087,065.00	792,308.65	284,853.50	30,000,00	314.853.50	.....	477,455.15	1.8426	60.261
1913	12,034,883.00	486.255.44	647,576.80	30,025.98	677,602.78	$191,347.34	.....	5.6303	39.351*
1914†	10,221,462.00	280,898.87	131,918.71	28,281.50	160,200.21	.....	120,698.66	1.5673	42.969
Total	$96,206,480.00	$4,030,691.16	$2,640,259.66	$178,307.48	$2.818,567.14	$191,347.34	$1,403,471.36	2.9382 Average	
Would be a profit of							$1,212,124.02		

*Loss. †To Dec. 31, 1914.

present computation indicating a profit of 42.969 per cent, which makes the cost to the association to cover loss and expenses approximately 1.887 per cent. This condition is distinctly creditable to every member, both regular and associate, for his part in supporting the association in its rules and suggestions and for the prompt manner in which each member has transmitted these instructions to his officers.

"At a recent meeting of your advisory committee, it was suggested that a chart going back five years before the formation of the association and showing the steady increase in rates for five years, and the steady reduction in rates for the following five years, would present a very striking object lesson of the saving made to subscribers by the work of this association, and your chairman was instructed to prepare such a chart.

owners each year including commissions paid to brokers from 1905 to 1914 inclusive:

1905	$10,702
1906	11,686
1907	11,642
1908	16,200
1909	16,200
1910	17,946
1911	16,830
1912	16,307
1913	14,742
1914	11,477

"You will observe that there was a steady increase in cost from 1905 up to and including 1910, the year following the formation of this association, and that this increased cost in 1910 was approximately $7,000 more than it was in 1905 or, 68 per cent. It also shows that there has been a steady decrease each year since 1910, and that the 1914 cost was very nearly down to the cost of 1905.

"The figures for 1913 include an extra assessment of $1,642 made by this association and which was necessary on account of the terrible disaster of Nov. 9, in that year. No credit has been taken in any of these years for profits which have been made on the percentage insured by this association. Had we deducted this profit from 1914 the cost for that year would show approximately a cost of $9,977."

A remarkable showing was made in the comparative statement of accidents. There were only 92 accidents in 1914, as against 428 accidents in 1909, the year in which the association was formed. The list has steadily declined since then. In 1910 there were 235 accidents; in 1911, 198; in 1912, 178 and in 1913, 150. No better proof than this of the purposes of the association could be submitted. The financial table accompanying is very illuminating. The insurance rate for 1914 was 3½ per cent, of which 3.3 per cent covered the navigation season and 0.2 per cent represented the winter port risk. The actual cost to the association, however, was less than 2 per cent and the profit on the business works out at 42.969 per cent. The profit for the year was $120,698.66 and in fact had the association carried 25 per cent of the insurance from the beginning of its organization, it would have made a profit of $1,212,-124.02, notwithstanding the heavy losses of the great November storm of 1913.

Jeffery's Marine Glue

Jeffery's marine glue, manufactured by L. W. Ferdinand & Co., 201 South street, Boston, Mass., has had a wide use aboard ship. It is represented that pound for pound it will go further do a better and more lasting job, than any other make. Following are the directions for its use: Cut the glue into small pieces; melt in pot or cauldron over any moderate fire, keeping it stirred now and then. When the glue is all melted the heat is about 212 degrees Fahr., but rather too thick to run freely, and if used in this state air bubbles may arise; therefore, it requires boiling and stirring a few minutes longer and should be used at a heat from 250 to 300 degrees. It then becomes perfectly liquid and should be used as quickly as possible.

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Grain Bill of Lading

Vessel Owners Will No Longer Continue to Guarantee Elevator Weights But Will Allow for Natural Wastage

WHEN the season of navigation opens on the Great Lakes next spring a thorn that has rankled in the sides of vessel owners for a quarter of a century will be no longer there, and that is guaranteeing elevator weights in carrying grain and being liable for any shortage. There has been considerable talk as to what was actually said and done at the meeting in Detroit on Jan. 6 with the grain shippers, and THE MARINE REVIEW presents herewith the gist of it.

Considerable impetus to the justice of the case of the vessel owners was lent by H. W. Richardson, a large grain shipper. He began by stating that he appeared as an independent, representing neither marine men nor grain men. He said that the vessel has had to stand the shortage on the lakes, whereas in oversea trade the shipper stands whatever shortage there may be. The shipper protects himself against it by paying insurance, sometimes ⅜, sometimes ½ cent and sometimes even more to ports that are not well looked after, such as Naples. On the lakes, however, the grain shipper has no worry whatever as the ship guarantees to deliver the cargo, and if she is short she pays for it. Regarding the disturbance in bank connections, which has always been made much of by the grain shippers whenever a new bill of lading has been proposed, he declared that a man who is not capable of standing a shortage of a quarter or one-half per bushel is not a person that the banks care to deal with. He declared that he would suffer as much as any man in the room by the adoption of a new bill of lading, but that he was prepared to suffer as he did not think the grain shippers had ever been square with the vessels. He also added that he was very much surprised that the vessels were satisfied for so many years to pay for shortage and declared that he had known vessels to pay out more for shortage than their entire earnings on the trip.

The issue was then discussed pro and con until the meeting was about to adjourn for lunch, when Mr. Coulby took a hand in the discussion. He stated that he had been in the lake business a great many years and that in listening to the discussion his mind had carried him back to a similar meeting that was held 15 years ago when the same question and the same arguments were advanced. The men who had advanced those arguments had practically all passed away. The issue, however, had not died. It had grown bigger and stronger and had obtained greater momentum. If there had been nothing to the issue it would have died with the men that had originally projected it. The issue had resolved itself as to whether the vessel men were to continue to act in the dual capacity of a transporter of grain and a guarantor of the elevator weights at both ends of the route, weights over which the vessel has not and cannot have any control. Mr. Coulby then pointed out that in the transportation business there must of necessity be in the rehandling of a commodity several times, a natural wastage that cannot be gotten away from. He for one felt that if he transported that commodity a thousand miles on its way from the farmer to the baker he ought to contribute his portion of the natural wastage incident to the business. He considered it utterly impractical for the ship to check up elevator weights. He believed it to be incumbent upon the elevator man to report what he had actually given the ship. The ship should be called upon, he said, to deliver what she has actually received. If a large shortage develops and it cannot be found to have leaked into the bilges or the water bottom, the lower elevator man should get after the fellow that shipped the stuff.

Guaranteeing of Weights

"That part of the contract, that is, the guaranteeing of weights," said Mr. Coulby, "is so unfair to the vessel men, not only in the judgment of the present-day vessel men, but to the predecessors, that they have made up their minds that it is not a good thing for them to continue; and, of course, they could, if they wanted to, arbitrarily, without any notice or without discussion, simply decline to renew that contract. Now one of your men —and he doesn't look to me to be one of the youngest in the business— Mr. Richardson, from your side, admitted that he could not see why the vessel should do it. We can't either. The vessel man does not want to get away from any of his liabilities, any of his obligations as a transporting medium on the lakes, but he does not want to continue to guarantee weights any longer. He is perfectly willing to stand his pro rata share of the natural wastage of doing the business, and it does seem to me that if you will start from that point you will get somewhere."

Mr. Coulby then stated that the figures taken over a series of years proved the actual shortage to work out at something less than ¼ per 1,000 bushels. He said that as far as his own boats were concerned, he always had a survey made of them by a disinterested person to determine whether they were in condition to enter the grain trade before they were put into it, and he believed there would be nothing unfair in requesting all vessel owners to do the same thing. He did not think that the vessel owners desired to evade their just liability, and that if it was proved that grain had actually leaked into the bilges, that the vessel should be required to pay for it; but that if no such claim could be established, the vessel's liability should be limited to the quarter bushel in 1,000 bushels.

In the afternoon session, in supporting a motion that a small committee of the two interests be appointed, Mr. Coulby said that it was his experience that if any subject was approached in the spirit of mutual helpfulness and a just recognition of rights and wrongs, it could be speedily cleared up and that a lot of mountains would dwindle into mole hills.

"We are all dependent one upon the other," said he. "You may think you can ship your grain without us, but you can't, and we cannot transport this grain without you, and we know it and realize it."

The joint committee was then appointed and retired for deliberation. Mr. Coulby acted as spokesman in announcing the result of the deliberation. He said:

"The result of the meeting was practically this: I do not think that I am justified in saying that the shippers unqualifiedly admitted the justice of the positions of the ships, but we told them that there wasn't any question at all in our minds but what the clause of guarantee in the bill of lading was really and truly a thing of the past, and that we were resolved

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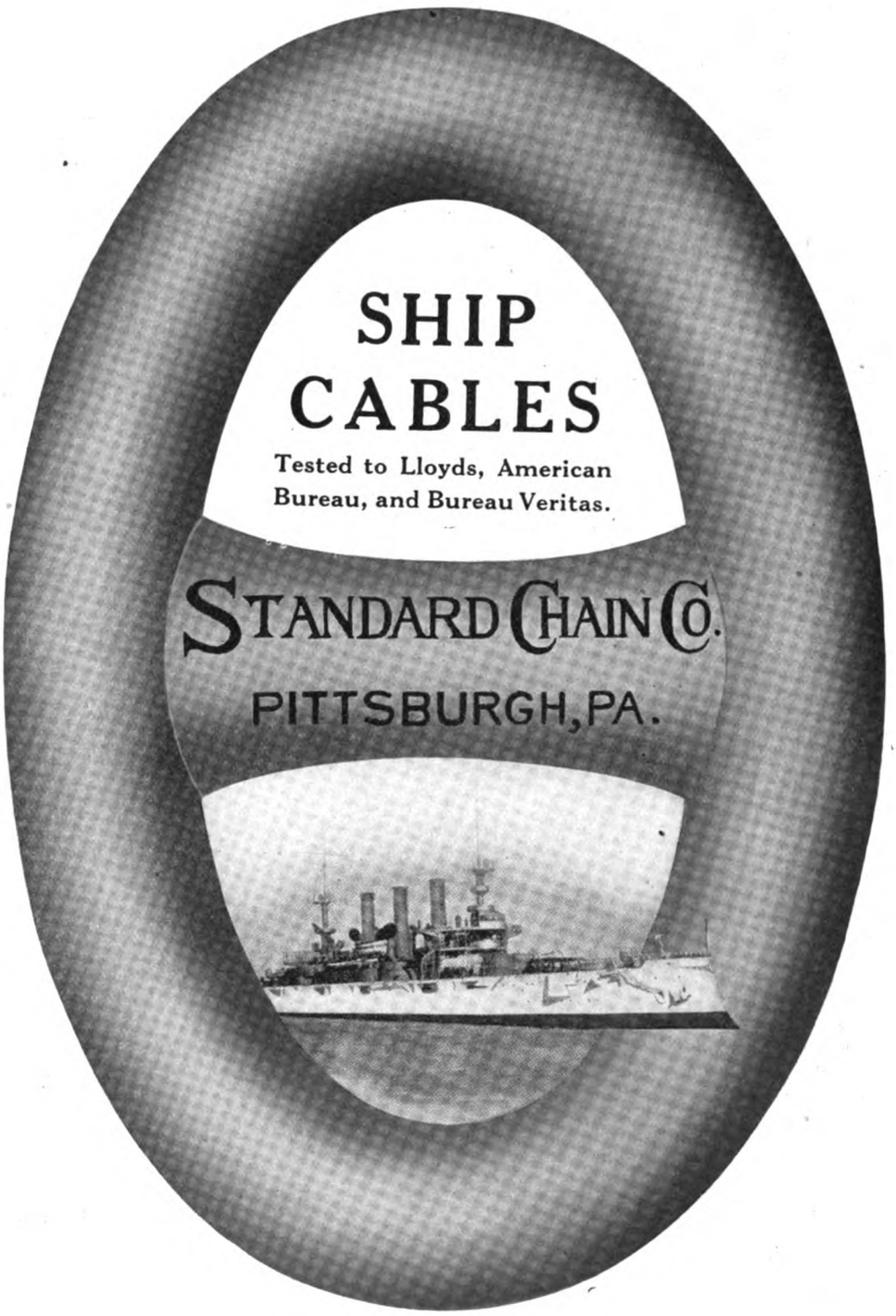

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to turn our faces forward and see what could be done to continue the business with that clause left out. As was talked in the meeting this morning, the statistics prove that the natural wastage in doing this business of the lakes was on an average of about ¼ bushel a thousand. The vessel men have agreed to take care of that quarter of a bushel in the thousand on the entire shipment—in other words, that could be deducted from each bill of lading, whether there was an overrun or a shortage. It was the sense of the committee that the question of adjustment ought to be lodged where it properly belongs, that is, in the hands of the elevators handling the commodity at the upper and lower lake ports. The gentlemen around seemed to be impressed with the proposition and thought that if we could give them a little time to start from that point with the exporters and others that they could work something out in the way of forming a little co-operation to take care of this ¼ bushel per 1,000. It was therefore agreed in the meeting to make the report back to this committee and give them time in which to devise ways and means of meeting that situation, it being distinctly understood that the trade cannot any longer rely upon, or expect, the vessel men to take that old guarantee into the bill of lading. That has got to be distinctly left behind us."

"Is that quarter of a bushel a thousand to come out of it whether there is a shortage or overrun?" was asked.

"Every cargo," replied Mr. Coulby. "It goes into this general corporation to take care of the general wastage in the business."

At the conclusion of the meeting Mr. Coulby said:

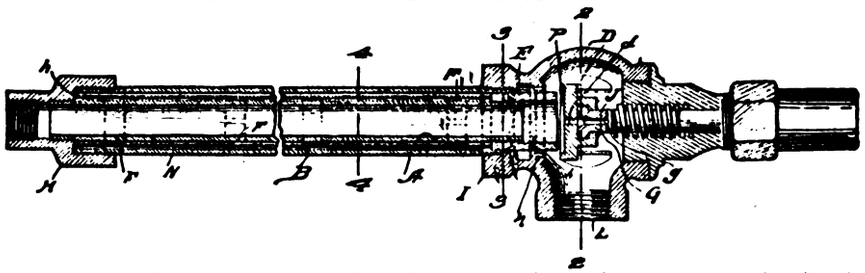
"I am about to go. Just one thought comes into my mind. John Sherman said that the way to resume specie payment is to resume. Now the Lake Carriers' Association, the vessel men here, have authority to act. In order that there may not be any misunderstanding at all as to the sincerity of the statement that we have made, and our conviction that that guarantee clause in the bill of lading is a thing of the past, I think that the best thing to do to get a good start on this is for the lake carriers or the vessel men at this meeting to go upon record that any grain that is chartered after this date will be subject to a bill of lading with the guarantee clause eliminated and the quarter of a bushel a thousand bushels inserted; so that then we have a specific, definite act on the part of one part of the body on which to act, and it will be a groundwork on which they can go ahead, because if they do not do that you are very likely to have a repetition of the feeling that has gone out in years past, that we might not be sincere; we might be bluffing and we might not stick. The best way to show our sincerity, and by reason of the fact that we have authority to act on behalf of the vesselmen, is that the vessel men today of themselves and by themselves determine that they will not load any grain at all in the interim except under a bill of lading with the guarantee clause eliminated and the insertion of the ¼ bushel a thousand."

The vessel owners later adopted the following clause to be used in place of the one hitherto enforced: "The vessel shall make no claim for any overrun in the outturn of cargo and assumes no responsibility for shortage, but shall allow a fixed amount of ¼ bushel per 1,000 bushels as tare to be deducted from the freight. All grain on board is to be delivered and freight is to be collected upon actual outturn. When two or more shipments are carried in the same compartment of the vessel, the shortage, if any, resulting upon unloading the last of these shall be borne pro rata by the shippers."

Some of the grain shippers have intimated that the new bill of lading is a violation of the Harter act, but vessel owners have been informed by counsel that there is nothing whatever in this contention. It is quite likely that by the time navigation opens the grain shippers will have made satisfactory arrangements for insuring shortage.

Barton Automatic Steam Trap

The Barton automatic expansion steam trap has met with favorable reception on the lakes, there being more than 1,000 in successful operation on lake boats. Its operation is effected by differences in temperature, expanding



or contracting between an inner (brass) and an outer (steel) tube. It can be installed on any pipe line without special equipment. It fits into the pipe line and takes up no more room than a regular valve. It standardizes trap requirements, the same trap giving equal efficiency whether on high or low pressure or vacuum. The listing of the ship has no effect on it as it operates in any position. It drains continuously and cannot freeze. Its simplicity is marvelous and its action is positive and automatic. It cannot become air-bound. A guarantee is given that the trap will work under a high pressure, low pressure or vacuum and that it will operate for two years without any cost for repairs. The company has received a letter from Douglas Brews, fleet engineer for M. A. Hanna & Co., in which he says that they are giving first-class results on the vessels of his fleet. The traps are manufactured by the Automatic Steam Trap Specialty Co., 318 Harper St., Detroit Mich.

Obituary

Ezra Nicholson died at his home in Lakewood, O., on Jan. 15, after an illness of several weeks. He was Lakewood's oldest resident and had watched its development from a farming district into one of Cleveland's most beautiful suburbs. He was born in 1835 and was a graduate of Berea College and Urbana University. He became greatly interested in horticulture and planted a considerable acreage in vineyards and orchards. When the civil war broke out, Mr. Nicholson enlisted and at the conclusion of the war became president of the Rocky River railroad. Mr. Nicholson was the first clerk and treasurer of the Rocky River railroad. In the early eighties he developed the Nicholson ship log for registering the speed of vessels which is in general adoption throughout the world. He is survived by three children, Ezra Louis, Clarence Percy and Mrs. Grace E. Thompson.

James Davidson, Bay City, Mich., is building two dump scows, 140 feet long and 30 feet beam, seven pockets with capacity of 500 cubic yards, to be equipped with steam winding gears and all latest improvements for handling the pockets expeditiously. Scows are entirely of oak, except sides, deck and bottom, and are strongly constructed according to the Howe truss plan. Dry dock of the company is to be extensively repaired.

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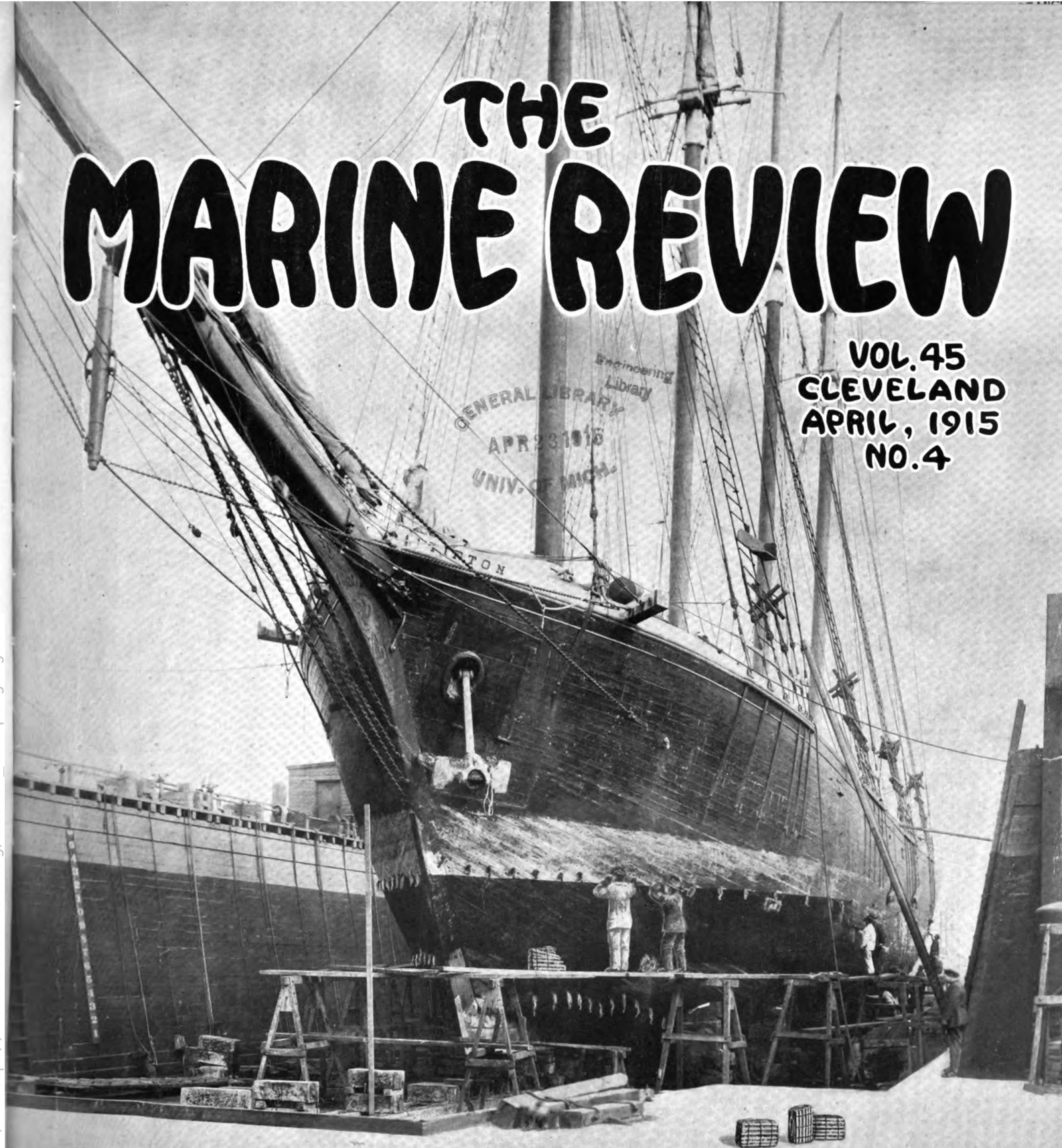

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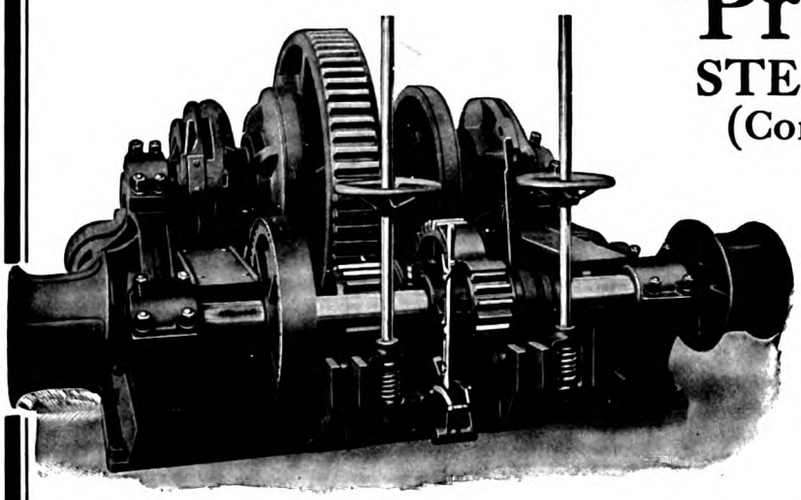

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